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Examining Gender Differentials in Health: The Impacts of Education, Employment, and Family Roles in Taiwan

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Examining Gender Differentials in Health:
The Impacts of Education, Employment, and Family Roles in Taiwan

by

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Dedication

To my parents, Cheng-Chin Fan and Fang Chang, for their unconditional love and support in my whole life.

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Examining Gender Differentials in Health:

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Just as in most industrial countries, in Taiwan, women seem more likely than men to experience poorer health during their life course. In recent national surveys conducted in Taiwan, women consistently report poorer health than do men. Nevertheless, the risk factors and the mechanisms through which they operate to produce gender differences in health in Taiwan remain poorly understood.

Evidence has suggested that gendered differences in health are a consequence of the stratification system. In current Taiwan society, women remain disadvantaged in terms of educational attainment, labor force participation, and division of domestic labor. Accordingly, while existing studies of gender differences in health in Taiwan focus on the comparisons of male and female health behaviors, this research highlights the important influence of education, employment, and family roles in shaping the gender gap in morbidity. Because many married women in Taiwan are informally employed in

family firms, this research also pays attention to examining the impact of working in a family business on the health of married women.

This project employs two data sets drawn from the Taiwan Social Change Survey in year 2000 and 2002. The effects of social factors on multiple health measures, including chronic disease status, illness status in the past two weeks, and self-rated health, are examined. Results indicate that gender differentials in health in different age groups are determined by different sets of social and behavioral factors. The impacts of combining paid work and family responsibilities on health vary depending on social and demographic variables such as gender, age, the type of employment, and the nature of family roles. Specifically, the findings reveal that the protective effect of familial employment is particularly significant among young married women. Finally, the effects of employment on health are found to be partly mediated through working hours.

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CHAPTER 1: INTRODUCTION

Just as in most industrial countries, in Taiwan, women seem more likely than men to experience poorer health during their life course. Table 1.1 demonstrates that, in recent national surveys conducted in Taiwan, women consistently report poorer health than do men. Different scales of self-rated health were applied in these three surveys. Despite the fact that there are some variations in gender differentials in health among the results, Taiwanese women are less likely than men to rate their own health as good or satisfactory. For instance, in the 2001 Social Development Survey, men are more likely than women to regard themselves as healthy by ten percentage points (53.66% versus 43.89%). Although the gender gap in health shown by the other two surveys is smaller, the difference between men and women in the healthiest category remains about five percentage points in both of these surveys.

The risk factors and the mechanisms through which they operate to produce gender differences in health in Taiwan remain poorly understood. Taiwanese women in general report poorer health, but they actually have higher life expectancy at birth than men (79.42 years for women and 73.59 years for men) [1]. Most of the existing health studies in Taiwan focus on gender differences in health behaviors for the Taiwanese population (e.g., Chiu et al. 2002; Chen et al. 2001; Tsai 1995; Tseng 2004). Results suggest that women are more likely than men to engage in health protective behaviors (except in regard to exercise). Based on these results, we may be able to partly account for why Taiwanese women live longer than men. However, the female advantage in healthier life style cannot explain why women tend to report poorer health than do men.

[1] Department of Statistics, Ministry of the Interior, Taiwan, 2005.

Table 1.1. Self-evaluated Health in National Surveys in Taiwan 2001 - 2003

	Men	Women
Social Development Survey (2001)[1]		
"Healthy"	53.66%	43.89%
"Fair"	37.26%	45.16%
"Not so healthy"	9.08%	10.94%
Health Promotion of Knowledge, Attitude, and Practice Survey (2002)[2]		
"Very good" and "Good"	56.2%	51.2%
"Fair"	33.4%	37.0%
"Very poor" and "Poor"	10.4%	11.9%
Citizen Life Survey (2003)[3]		
"Very satisfied" (with current health status)	25.8%	21.2%
"Satisfied"	58.2%	59.9%
"Not so satisfied"	13.0%	15.2%
"Very unsatisfied"	2.9%	3.5%

1. Directorate-general of Budget (DGB), Accounting and Statistics, Executive Yuan-Central Region Office, Taiwan. 2001. "Report of Social Development Survey."
2. Bureau of Health Promotion (BHP), Department of Health, Taiwan. 2002. "Project Report of Health Promotion of Knowledge, Attitude, and Practice"
3. Ministry of the Interior (MI), Executive Yuan, Taiwan. 2003. "Summary Report of Citizen Life Survey."

The mechanisms underlying the sex-related "mortality-morbidity paradox" (or "morbidity paradox"), i.e., women live longer, but are more likely to report poorer health, remains unclear. While some studies suggest that this paradox is due to the fact that the female population is older and their longer life span yields a greater chance to report poorer health (Crimmins, Kim, and Hagedorn 2002; Crimmins, Hayward, and Saito 1996), Gorman and Read (2006) argue that gender differences in health are more complex than variation in the age structure of the male and female populations. For example, a consistent pattern of female disadvantage in certain health measures (such as functional limitations) over their life course has been found (e.g. Gorman and Read 2006; Macintrye, Hunt and Sweeting 1996).

According to Link and Phelan (1995), social factors such as socioeconomic status and social support are fundamental causes of disease. Evidence has suggested that gendered differences in health are a consequence of a stratification system (Denton, Prus, and Walters 2004; Ross and Bird 1994). Because men and women occupy different social-structural locations, the opportunity for their exposure to hazardous environment, their participation in risky health behaviors, and their access to goods and resources that promote well-being are quite different (Bird and Rieker 1999). Thus, we may turn to gender stratification in Taiwan society to find the underlying causes of gender differentials in health.

Gender differences in health has been constantly studied by demographers, epidemiologists, and sociologists (e.g., Bird and Fremont 1991; Bird and Rieker 1999; Case and Paxson 2005; Courtenay 2000; Denton, Prus, and Walters 2004; Macintyre, Hunt and Sweeting 1996; Rieker and Bird 2000; Ross and Bird 1994; Verbrugge 1985). One of the latest examples is the continuing research interest seen in Gorman and Read's study published in 2006. They investigate gender-by-age differences in multiple health measures and examine whether social and behavioral mediating factors operate uniformly across health measures. Their results showed that the gender gap in health varies in direction and magnitude with age depending on the health measures considered. In addition, the mediating mechanisms vary among different health measures examined. Their research suggests the importance of examining multiple health outcomes across adulthood for research on gender differences in health.

Although this dissertation was underway when Gorman and Read's study was published, their work provides a very useful guide as many of our interests overlap. Both of our studies employ multiple health measures to document gender differentials in health across adulthood and examine potential mediating mechanisms for each health measure.

The major difference is, of course, that this dissertation investigates gender difference in health for the Taiwanese population. Therefore, more attention will be paid to social factors that may assume greater importance in Taiwan society than in the United States As only one example, I focus on employment in family businesses—a very different phenomenon than it is in the United States.

In current Taiwan society, women remain disadvantaged in terms of education attainment, labor force participation, and division of domestic labor (DGB 2003). While the gender gap in educational attainment has decreased in the past four decades (DGB 2005), female participation in the labor market is still much lower than that of men (Yi and Chien 2001). In addition, although the expanded employment opportunities for women present the possibility of an adjustment via a division of household labor, Taiwanese women still spend much more time on housework than do men (Lu and Yi 1998). As there is a decreasing gender difference in educational attainment in Taiwan, the effects of this factor are explored. In addition, this project gives specific attention to the health effects of employment and family roles on individual health among men and women in Taiwan.

Two theoretical hypotheses regarding "multiple roles," i.e. the combination of family and work roles, are usually applied to explain health differences between employed women and housewives. While the role accumulation hypothesis proposes that the benefits of role accumulation on health (e.g., more social support and financial resources) tend to outweigh the disadvantages (e.g., work overload) caused by multiple roles (Arber 1991; Dennerstein 1995; Sieber 1974), the role strain hypothesis proposes that multiple roles cause role overload and role conflict that contribute to increased stress and excessive demands on time, energy, and psychological resources that then results in poorer health (Verbrugge 1986; Waldron and Jacobs 1989; Waldron and Weiss 1998).

While empirical evidence has been found to support each of these hypotheses, these studies provide limited discussion on how health effects of multiple roles could vary in different contexts. Thus, a number of researchers contend that, in order to better understand the impacts of multiple roles on health, more specific characteristics of the social roles examined are required (Fokkema 2002; Janzen and Muharjarine 2003). These characteristics include whether a person is male or female, the type of employment, the nature of family roles, and stage in the life course which may mean that multiple roles and different combinations of roles affect individual health differently. For instance, being married and employed in a family business can be beneficial to health for young adults (age 18 – 44), but may have no significant health effects for people in middle age (age 45 – 64). Accordingly, this project attempts to extend prior research to test these two hypotheses under different role contexts in Taiwan society. Portions of the data used in the present analysis present a rare opportunity to examine the effects of psychosocial mechanisms.

While investigating the health effect of multiple roles, this project pays specific attention to examining the impact of working in family business on health for married women. In Taiwan, as in many other places, women are less likely to stay in the labor force after they are married**.** In order to cope with the conflict between work and family, many married women in Taiwan are informally employed in family firms (Lu 1992; Yi and Chien 2002). Studies have shown work roles in family business are likely to be extensions of family roles (Yi and Chien 2001). In family firms, men are in charge of "exterior" matters such as contacting customers or taking orders from them; women are responsible for administration of the firms and maintaining good relationships with customers and collaborative firms. The work-related power relations between the boss and "boss's wife," and the gender roles of each of them, are the consequence of constant

gender construction, which does not happen in a non-familial firm (Lu 2001). In addition, compared to those employed in non-family firms, women working for family businesses may enjoy more flexibility in balancing their responsibility for family with a paid job. While evidence suggests that married working women in Taiwan experience great stress, which is associated with poor health (Cheng and Chen 1995), it remains unknown whether familial employment yields different health effects compared to non-familial employment for Taiwanese women.

There is only limited research that examines social factors associated with gender differences in health in Taiwan. Social roles are found to be associated with gender differences in health (Chen et al. 2005; Tsai 1995) Nevertheless, these studies either did not examine an extensive range of social factors that could mediate the effects of gender on health or did not investigate measures that evaluate individuals' global health or chronic conditions. Other related research has been conducted in Taiwan (see Chapter 2), but none focuses on the substantive quests addressed in this dissertation. Thus, social causes of gender differentials in health for the Taiwan population remain to be determined.

In order to document the gender difference in health in Taiwan and to explain this differential by social determinants, this project employs two data sets drawn from the Taiwan Social Change Survey in the years 2000 and 2002. The main data set (2000 and 2002) allows me to examine the effects of education, employment, and family roles on multiple health measures, including chronic disease status, illness status in the past two weeks, and self-rated health, for different gender and age groups. The supplementary data set (2002) provides me a rare chance to investigate psychosocial mechanisms between types of employment and health for men and women. Compared to the United States, Taiwan society is less diverse in terms of race, ethnicity, immigration, as well as small

regional variation in these factors (Liu and Sakamoto 2005). Therefore, when examining the effects of social factors on health, unobserved heterogeneity of Taiwan's education system and labor force is expected to be relatively small.

To summarize, gender differences in health in Taiwan have been documented in official statistics and national surveys. However, there is a lack of research addressing the underlying explanations of this differential. Accordingly, the larger agenda of this dissertation is to identify primary social factors associated with gender differentials in health among Taiwanese adults. The agenda also includes examining the psychosocial mechanisms that link these factors to health status for men and women. Based on this research agenda, this project contains the following aims: (1) to investigate whether, and to what extent, gender differentials in health exist in Taiwan, (2) to examine whether, and to what extent, social factors like education, employment, and family roles contribute to gender differentials in health in Taiwan; (3) to examine whether gender differences in health in Taiwan increase or decrease by age, and examine whether the risk factors of health vary by age; (4) to examine the effects of multiple roles on health in different role contexts and to test the role accumulation and role-strain hypotheses; (5) to investigate possible psychosocial factors mediating the effects of employment on individual health status for men and women in Taiwan. These aims can be reduced to four research hypotheses (on page 33-34), which in turn are investigated by decomposing the hypotheses into a series of specific research questions (on page 35-36).

This dissertation is composed of six chapters including this introduction (Chapter 1). In Chapter 2, I review the previous literature on: 1) gender differentials in health in current Taiwan society, 2) the association between education, employment, and family roles and gender difference in adult health, 3) health effects of multiple roles, 4) familial employment in Taiwan, and 5) gender differences in health among different age groups.

Given the scarcity of this type of research, I also draw, from time to time, on research conducted in other countries, especially the United States. Based on this review, I generate a conceptual model and propose certain hypotheses to guide the analysis of the effects of social factors on gender differentials in health among Taiwanese adults. Chapter 3 is devoted to data and methods used for this project. There, I first provide an overview of the research design and data set employed; then I discuss variables and statistical methods utilized to test hypotheses. In Chapter 4, I examine the findings and analyze the results for three dimensions of health employed as dependent variables in the main data set: chronic disease status, illness status in the past two weeks, and self-rated global health status. The association between education, employment, and family roles and health on each gender group over different stages of the life course will be investigated. Special attention is paid to the health effects of different types of employment (self-employment, non-familial employment, and familial employment). In Chapter 5, a supplementary data set is used to examine potential mediating mechanisms between types of employment and health. Psychosocial factors such as role strain are examined to see whether they mediate the effects of employment on health. Lastly, Chapter 6 synthesizes overall findings and analyses from both the main and supplementary data sets and suggests avenues for future research.

CHAPTER 2: CONCEPTUAL FRAMEWORK

While investigating gender differentials in health, most biomedical studies focus on physiological differences between men and women and ignore gender as a social construct that could affect the physical health of men and women (Gorman and Read 2006). Link and Phelan (1995) argued that social factors such as socioeconomic status and social support are fundamental causes of disease, and evidence has shown that gendered differences in health are a consequence of a stratification system (Denton, Prus, and Walters 2004; Ross and Bird 1994). Because men and women occupy different social-structural locations, their exposure to hazardous environments, their participation in risky health behaviors, and their access to goods and resources that promote well-being are quite different (Bird and Rieker 1999).

Bird and Fremont (1991) indicated that men occupy more highly rewarding social roles than do women. They contended that women's higher morbidity levels are due to less paid work and lower wages combined with more hours spent in household labor, child care, and helping others, and fewer hours of leisure and sleep. Their studies showed that, when gender differences in social roles are controlled, men exhibit poorer health than women.

Existing research conducted in Western societies has found that education, employment, and marriage are associated with health status (Bird and Ross 1993; Lahelma et al. 2004; Macran et al. 1994; Mirowsky and Ross 2003; Ross and Mirowsky 1995; Umberson 1992; William 2004; Wyke and Ford 1992). The social, economic and cultural effects on health outcomes are mediated by social capital, roles, psychosocial stresses and resources, health services, and behaviors. (Moss 2002). Currently, in Taiwan society, women are still disadvantaged in terms of education attainment, labor force

participation, and division of domestic labor (DGB 2003). Thus, gender differentials in health in Taiwan could result from gender disparities in education, work, and family.

In addition, the pattern of associations between social factors and health could be different for men than for women. For instance, Denton and Walters (1999) indicated that, for women, social structural factors are more important in determining health. Having higher income, working full-time, caring for a family, and having social support are more likely to predict good health for women than for men. Body weight and being physically inactive are also more important for women than for men. On the other hand, smoking and alcohol drinking are more important determinants of health status for men than for women.

In order to generate a conceptual framework for this research in the following paragraphs, I review existing literature on: 1) the association between education, employment, family roles, and gender differences in adult health, 2) health effects of multiple roles, 3) familial employment in Taiwan, and 4) gender differences in health among different age groups. Based on the review, I propose certain hypotheses to guide the analysis of the effects of social factors on gender differentials in health among Taiwanese adults.

1. TAIWANESE CONTEXT

Taiwanese women consistently report poorer health than do men in national surveys (Bureau of Health Promotion [BHP] 2002; Directorate-General of Budget [DGB] 2001; Ministry of the Interior [MI] 2003). In addition, the prevalence of some chronic diseases, such as diabetes and osteoporosis, are higher among women. Pan and her colleagues (2003) showed that, among people aged 19 years old or more, the prevalence of diabetes mellitus (DM) was 3.7% in men and 6.3% in women. Chie et al. (2004)

indicated that the incidence rate of hip fractures was 1.6 times higher and tended to occur about 5 years earlier among women than among men.

A number of existing studies of health in Taiwan focus on the differentials between male and female health behaviors. In Taiwan, just as in many other countries, men are more likely to engage in risky behaviors that lead to poorer health. Chiu et al. (2002) examined prevalence rates of behavioral risk factors for cardiovascular disease for men and women. They found higher prevalence rates of behavioral risk factors in men except for being overweight. Taiwanese men are more likely than women to smoke, drink, chew betel nuts, and use illicit drugs (Chen et al. 2001; Tsai 1995; Tseng 2004). However, these findings cannot explain why men tend to report better health than women.

Compared to men, women tend to take better care of their health. For instance, women are more likely to pay more attention to nutrition. While exploring the gender differences in supplement use, Chang and Chiang (2002) found 22.2% of females and 12.7% of males used vitamin supplements, and 10.2% of females and 3.7% of males took calcium supplements. In addition, women were more likely than men to use health care services in Taiwan. While women's proportion in the Taiwan population was about 49.06% during the years 2002 to 2004 (DGB 2002-2004), their proportion of outpatient visits was about 54.36% (on average) during this period. Some studies in other countries suggest that men tend to underuse primary care health services despite their suscepitibility to particular types of illness (Tudiver and Talbot 1999), but there is little or no research on whether Taiwanese men have the same behavioral pattern. Therefore, it is unclear that Taiwanese women's higher rate of medical service usage is due to their higher attention to their health or to a less healthy status compared to men.

Although men tend to engage in more risky health behaviors, they are also more likely to exercise than women, which enhances male health. According to the Centers for Disease Control and Prevention and the World Health Organization, increasing physical activity may help promote health and preserve the quality of life in late adulthood. (Kaplan et al. 2001; Unger et al. 1997). Physical inactivity is found to be associated with multiple adverse health outcomes such as heart disease and diabetes (Berrigan and Troiano 2002). Tsai's research on the Taiwanese population in 1995 showed that men tend to exercise more often than women.

Few studies have examined social factors associated with gender differences in health in Taiwan. Tsai (1995) interviewed 453 adults in Chiayi County and found that men reported better health than women. She then suggested that gender differences in health are associated with gender-roles shaped by society and culture. However, she did not identify specific societal and cultural factors that could affect gender-role differences for Taiwanese men and women. Chen et al. (2005) examined sociological explanations for the higher level of insomnia in women. They found an association between the role of homemaker and increased night time sleep disturbance. The above two studies either did not examine an extensive range of social factors that could mediate the effects of gender on health or did not investigate measures that evaluate individuals' global health or chronic conditions.

To summarize, evidence of gender differentials in health has been consistently found in Taiwan. Taiwanese women are more likely than men to report poorer health. Most existing health studies in Taiwan focus on gender differences in health behaviors. Results suggest that compared to men, women are more likely to engage in health protective behaviors (except in regard to exercise) and less likely to engage in risky health behaviors. The female advantage in healthier life style obviously fails to explain

why women report poorer health than men. Only limited research investigates social determinants of gender differences in Taiwan. Consequently, social causes of gender differentials in health for the Taiwan population remain to be determined.

2. EFFECTS OF EDUCATION ON GENDER DIFFERENCES IN HEALTH

Education increases individuals' control over their lives and enables them to lead a healthy lifestyle. As Mirowsky and Ross (2003) argued: "Education gives individuals the intellectual tools they need to gain control of their own lives. That in turn gives individuals the knowledge, motivation, and discipline to adopt healthy practices such as exercising, eating a balanced diet, restricting caloric intake, not smoking, drinking in moderation, …" (2003: 198 –99). The benefits of education for health have been confirmed by many empirical studies. Above all, highly educated individuals are found to smoke less and exercise more (Brome et al. 2004; Gallant and Dorn 2001; Holahan and Suzuki 2004; Lahelma et al. 1997; Lynch, Kaplan, and Salonen 1997; Ungemack 1994). In addition, the patterns of association between education and health are found to be different between men and women. Hill and Needham (2006) examined 21 years (1972 – 2002) of repeated cross-sectional data from the General Social Survey and found that women had benefited more than men in health status improvement from increased educational attainment. Lahelma et al. (2004) demonstrated that, among men, most of the inequalities in health by education were mediated through occupational class and income. On the other hand, among women, only half of inequalities in health by education were mediated through occupational class and household income.

Women in Taiwan have, in the past, not been encouraged to pursue higher educational degrees. Parents tended to invest in sons' rather than daughters' education (Parish and Willis 1993). This tradition results in gender stratification in education for the current Taiwan population. Table 2.1 shows that in year 2003, 62.9% of men had a high

Table 2.1. Distribution of Education, Labor Force Participation and Unemployment Rate by Gender for Individuals aged 15 and Older in Taiwan, 2003.

	Men	Women
Highest Degree (%)		
Primary & Below	19.7	28.0
Junior High	17.5	12.7
Senior high & Vocation	33.6	33.8
Junior College Above	29.3	25.5
Labor Force Participation (%)	**67.69**	**47.14**
By Marital Status		
Single	55.49	54.52
Married or Cohabitating	76.67	47.10
Divorced, Separated, or Widowed	49.53	27.87
By Education		
Junior High School or below	63.47	32.64
High school	71.64	53.42
College or above	68.51	61.95
Average Monthly Earning of employee (NTD)[2]	**46,921**	**36,548**
Unemployment rate (%)	**5.51**	**4.25[3]**
By Marital Status		
Single	9.98	8.18
Married or Cohabitating	3.42	1.91
Divorced, Separated, or Widowed	8.41	4.90
By Education		
Junior High School or below	6.19	3.38
High school	6.19	4.84
College or above	3.91	4.31

Source: Directorate-general of Budget, Accounting and Statistics, Executive Yuan, Taiwan. 2003. "National Statistics: Human Resources Survey"

school diploma, compared to 59.3% of women. However, education disparity between men and women in Taiwan has been decreasing in the past four decades. More and more women have received higher education and have college degrees. The female students' ratio in college and university has increased from 23.39% in 1961 to 49.81% in 2001

[2] One New Taiwanese Dollar (NTD) equals about 0.03 US$ in year 2003

[3] To some degree, women have a lower unemployment rate because a smaller proportion of them, compared to men, are in the labor force. That is, women who are homemakers and not looking for work are not included in the calculation of the unemployment rate.

(DGB 2005). Thus, we may expect the gender disparity in education to disappear within the relatively near future.

Protective effects of education on health have been found in studies of the Taiwanese population. Ofstedal, Zimmer and Lin (1999) found that lower education is associated with poorer cognitive functioning among older persons. In general, people with higher educational attainment are more likely to engage in behaviors that lead to better health. Chang and Chiang (2002) indicated that people with more education are more likely to use vitamin/calcium supplements. Pan and Lee (1999) found that individuals with college degrees are less likely to smoke. If they smoke, they are also more likely to quit. Liu and Chen (2002) showed that education levels are associated with increased probability and larger quantities of private insurance purchases.

To summarize, education has been found to be associated with health promoting behaviors and better health. Some studies show that the patterns of association between education and health are different between men and women. As Taiwanese men on average still enjoy a better chance of receiving higher education than women do, whether, and to what extent, this education inequality contributes to current gender differentials in health in Taiwan remains unclear.

3. EFFECTS OF EMPLOYMENT ON GENDER DIFFERENCE IN HEALTH

Employment increases household income and decreases economic hardship, and in turn improves psychological and physical wellbeing. When examining the 1985 and 1986 British General Household Survey, Sara Arber (1991) indicated that occupational class and paid employment are the most important attributes associated with health status for women and men. Using longitudinal data, Ross and Mirowsky (1995) found that full-time employment predicts slower declines in perceived health and in physical functioning for both men and women. In Taiwan, employment has been found to enhance individuals'

mental health. Cheng et al. (2005) examined the prevalence of job insecurity and its associations with psychosocial work characteristics and health status. Results suggested that job insecurity was strongly associated with poor health, even with adjustment for age, job autonomy, job demands, work place, and social support. To investigate the health effects of unemployment, Tsai et al. (2004) examined medical care utilizations before and after exposure to involuntary unemployment under the National Health Insurance Program in Taiwan. They found an increase in health care utilization for mental diseases after unemployment.

In addition, employment can provide individuals with health insurance and offer access to more affordable health care services. In Taiwan, before the government established national health insurance (NHI) in 1995, employed people were covered by three major health insurance programs: farmer's insurance, governmental insurance, and labor insurance. The non-working population, except wives of government employees, were not covered by public health insurance. Chou and Staiger (2001) found that the availability of insurance for non-workers (provided by NHI) was associated with a four percentage point decline in labor force participation among married women. Thus health insurance appears to be an important incentive for married women to find a job. After the establishment of NHI, Liu and Chen (2002) analyzed household decisions to purchase private health insurance. They found the employed are more likely to purchase private health insurance than the non-employed.

In many societies, women may encounter more discrimination than men in the labor market. Compared to women, men tend to have higher positions and higher wages (Appold, Siengthai, and Kasarda 1998; Crompton, Hantrais, and Walters 1990; Hogan, Perrucci, and Behringer 2005; Kemp and Beck 1986; Ridgeway 1997). Because traditional expectations define women as homemakers, women's opportunity of entering

the labor force is further limited after they are married. Compared to single women, married women have even less chance of remaining in the labor market (Arber and Ginn 1995; Hogan, Perrucci, and Wilmoth 2000; Li and Currie 1992). Evidence shows that women in lower status occupations and who have lower income are more likely to report poor health (Macran et al. 1994; O'Campo, Eaton, and Muntaner. 2004).

In terms of income and chance of being employed, gender disparity in the labor market still exists in Taiwan. According to Table 2.1, 67.69% of men are in the labor force, compared to 47.14% of women. Also, men's participation in the labor force is higher across each level of education, but the gender gap is smaller at higher levels of education. When Tseng (2001) examined the changes in gender differences in earnings in Taiwan, he found male average monthly earnings were about 30%, 31%, and 27% greater than those of the female labor force, respectively, in 1982, 1992, and 2000, respectively. Although, in general, the gender gap in earnings has declined in the past 20 years, the degree of decline is small. Also, compared to married men, married women have a much smaller chance of working outside the home. Table 2.1 shows that in year 2003, while 76.67% of married men were employed, only 47.10% married women stayed in the labor force.

Despite the fact that a policy of maternity benefits in Taiwan has shown positive effects on Taiwanese women's return to jobs after childbirth (Zveglich and Rodgers 2003), about 45% of Taiwanese women withdrew from the labor market after being married or giving birth (Yi and Chien 2001). Chang (2006) found that job status of both wives and husbands and husbands' ethnic background and gender-role attitudes have significant impacts on women's decisions about quitting their jobs. According to results from the "Taiwanese Women's Life Survey" (MI 2002), the major reason for women not being employed was "taking care of children"(26.0.%). In a large-scale comparative

study of the impact of economic development on workers' employment and family life in Taiwan and China, Chow and Hsung (2002) reported "marriage and especially parenthood remained barriers to women's employment, promotion, and equity in the workplace." (2002: 98). In addition, Chuang and Lee (2003) indicated that a husband's negative attitude toward a working wife greatly influences his wife's decision regarding entering the labor market.

Studies have often shown that homemakers tend to have poorer health than employed women (Macran 1994; Ross and Mirowsky 1995). Some researchers argue the less healthy status of housewives may result from health selection of the labor market (West 1991). That is, healthier women are selected into the labor force. However, Macran et al. (1994) demonstrated that, after controlling for the presence of a long-standing illness or disability, women who were economically inactive (including housewives and unemployed) were still more likely to evaluate their health as "less-than-good" than women in paid work. It appears that not all of the poor health usually attached to the role of "housewife" can be explained in terms of labor market health selection.

Alternatively, some scholars attribute the health differentials among housewives and employed women to the characteristics of paid and unpaid work. Bird and Ross (1993) argued that unpaid domestic work is more routine and provides less gratification and fewer rewards than paid work. MacDonald, Phipps, and Lethbridge (2005) indicated that women's greater hours of unpaid work contribute to women experiencing more stress than men. They also found that hours spent on eldercare and housework were more stressful than those spent on childcare.

The discussion presented above shows that employment provides individuals with financial and medical resources, and in turn improves individual health. Compared to men, women in Taiwan have less chance of entering the labor market, especially after

being married or giving birth. While market health selection cannot fully explain housewives' poorer health compared to employed women, it is likely that gender stratification in the labor market contributes to gender differentials in health.

4. EFFECTS OF FAMILY ROLES ON GENDER DIFFERENCES IN HEALTH

Many studies conclude that marriage and parenthood in general are associated with longevity and good mental and physical health (e.g., Lillard and Waite 1995; Macintyre 1992; Rogers, Hummer, and Nam 2000). Married people are regarded as having more material resources, less stress, less likely to engage in risky health behaviors, and more apt to have social support. For instance, married Taiwanese females appear to be more likely to purchase private insurance than their counterparts (Liu and Chen 2002). Evidence shows that material resources and perceived quality of social support can account for a great proportion of the effect of marital status on health (Wyke and Ford 1992). In addition, the benefits from marriage for both husband and wife are also found to cumulate as the length of the union increases (Lillard and Waite 1995). Consequently, women living on their own or as single mothers with dependent children were found more likely to report poorer health than women living with a partner (Macran et al. 1994).

Effects of having children on health are found to vary by gender. Nomaguchi and Milkie (2003) found that having children may reduce married women's depression but had little influence on married men. Woo and Raley (2005) indicated that having a child is positively associated with social integration for both married and single women, but has no significant effect on men. Hewitt, Baxter and Western's (2006) study suggested that having preschool children in the household has negative impacts on self-rated health for men but positive impacts for women. Overall, having children is more beneficial to health for women than for men.

Marriage provides social control to help individuals to engage in health promoting behaviors. For instance, the food consumption of married men and women was more in line with dietary guidelines than that of those who had been previously married (Roos et al. 1998). Also, marriage was associated with an increased probability of smoking cessation for men (Broms et al. 2004). Some scholars argue that the protective effect of marriage from risky health behavior results from the transition of marriage, not from marriage itself. After her analysis of a national panel survey conducted in 1986 and 1989, Umberson (1992) found that, while the transition from unmarried to married status exhibits little effect on health behavior, the transition from married to unmarried status is associated with an increase in negative health behaviors. Using longitudinal data from the Changing Lives of Older Couples Study, Williams (2004) also demonstrated that individuals who experienced the transition to widowhood reported a significant decline in the frequency of health reminders and health assistance received from others. The decline in health regulation has important consequences for health behavior and health outcomes. Thus, she argued that widowhood undermines health and increases health risky behaviors, because it tends to be accompanied by a decline in health regulation.

Effects of marriage on health seem to be different for men than for women. Umberson (1992) argued that marriage is beneficial to health because married couples monitor and control each other's health behaviors. However, she found that marriage is associated with substantially more effort to control health for men than for women. Those who attempt to control the health of others are more likely to be women than men. In addition, Lillard and Waite (1995) suggested that improved financial well-being accounts for much of the beneficial effect from marriage for women but not for men.

On the other hand, marriage and parenthood do have negative impacts on individual health in certain respects, especially for women. These negative effects could

be mediated by the burden of domestic labor and stress caused by role demands (Nomaguchi and Milkie 2003). In many societies, married women are defined as homemakers and are responsible for most of the housework. The Taiwanese Women's Life Survey (2002) showed that 79.3% of women reported themselves as primary housework providers. Most husbands of married respondents in this survey (67.9%) helped with less than 1/4 of housework. Evidence suggests that equity in the division of domestic labor is associated with lower levels of depression for women (Glass and Fujimoto 1994). In Taiwan, factors that affect husband's behavior in sharing more housework include high education for both husband and wife, husband's and wife's egalitarian ideals about gender roles, and wife's income as a proportion of family's total income. (Lee, Yang, and Yi 2000)

While examining level of stress perceived by women for different roles, Hu and Chen (1992) found that women in Taiwan considered the role of mother and daughter-in-law as very demanding. Roles of worker and of wife were deemed less demanding. Results of this study imply that the evaluation of role demand was associated with level of stress. Rather than the physical workload of roles, the worry and distress of the caretaking process attached to the role were found more related to women's stress.

In Taiwan, women are more likely to be the major caregiver in a family. Chao and Roth (2000) indicated that caregiving behaviors were influenced by cultural expectations when a parent-in-law was ill. For Taiwanese women, maintaining filial piety was identified as a primary duty, a lifelong commitment, and a desired outcome. Also, health effects of caregiving were found to be different between men and women. Chiou, Chen, and Wang (2005) examined the extent to which negative health consequences are experienced by male and female caregivers. They found that, compared to male

caregivers, female caregivers are more likely to report suffering from symptoms of lack of well-being, and a decrease in psychosocial health and overall self-rated health.

Studies indicate that simple occupancy of family roles does not explain away gender differences in health. It is the characteristics of family roles that have significant health effects (Rushing and Schwabe 1995), and role characteristics can be quite different in different structural contexts (Khlat, Sermet, and Pape 2000). Sara Arber (1991) found that women without children have particularly poor health status, especially those not in the labor market. In their analysis of prospective data from the National Longitudinal Surveys of Young Women, Waldron, Hughes and Brooks (1996) found that significant marriage protection effects only existed among women who were not employed. They argued that marriage provides an alternative source of financial resources and social support for women who did not have a paid job. Hewitt, Baxter, and Western (2006) also found that, for women, the combination of full-time employment and children has a negative impact on health, but combining children with part-time or no employment has a beneficial health effect. Thus, the family roles characteristics for employed women may be different from those of housewives. Regarding contextual effects, Sacker et al. (2001) maintained that different path models of social position to health are required to fit the data for women at home as compared to those in full-time or part-time work.

In sum, marital and parental roles in general are associated with health and longevity, for they provide individuals with financial resources, social support, and social control on health behaviors. The impacts of family roles on health appear to vary for men and women. While men seem to derive more benefit from maintaining health protective behaviors through spouse's control, women benefit more from financial resources and social integration accompanied by marriage and parenthood. In addition, for women, certain role expectations such as being caregivers and homemakers may have negative

impacts on female health. The characteristics of family roles for men and women are conditioned by social context. The combination of employment and family roles appears to have more impact on health for women than for men.

5. EFFECTS OF MULTIPLE ROLES ON GENDER DIFFERENCES IN HEALTH

According to cultural expectations in many societies, men are defined as the primary breadwinners, and women are defined as homemakers. Because of these role expectations, women tend to experience more stress while facing conflict between work and family roles. Artazcoz, Borrell, and Benach (2001) analyzed the 1994 Catalonian Health Survey to determine whether there are gender inequalities in health among male and female married/cohabiting workers in Spain. They found that family demands had a greater impact on health and health related behaviors for women than for men. In a society that gives extra weight to women's traditional roles as wives and mothers, the effects of positive and negative factors associated with paid work can counterbalance each other. For instance, women's paid work was not found significantly associated with better health in Iran, because the effect of increased esteem was offset by increased stress (Ahmad-Nia 2002). On the other hand, because of gender role expectations, the impact of unemployment on health could be greater for men. Artazcoz and colleagues (2004) indicated that unemployment had a greater negative effect on the mental health of men than on that of women. They argued that the gender differential effects were related to family responsibilities and social class.

Two theoretical hypotheses regarding "multiple roles," i.e., the combination of family and work roles, are usually applied to explain health differences between employed women and housewives. The Role Accumulation Hypothesis proposes that while multiplicity of roles may produce role strain as a consequence of role conflict or role overload, the benefits of role accumulation on health tend to outweigh any stress

caused by multiple roles. The benefits of multiple roles include more sources of social support, satisfaction, self-esteem, and financial resources (Sieber 1974). This hypothesis has found some support from a number of empirical studies. For example, Waldron and Jacobs (1989) analyzed longitudinal data on older middle-aged women to examine the health effects of three roles: labor force participant, spouse, and parent. Their findings suggest that involvement in multiple roles in general result in a smaller increase of health problems within five years. In her literature review, Dennerstein's (1995) reported that multiple roles have beneficial rather than adverse effects on mental health in many studies. However, she also noted that husbands' negative attitudes toward women's paid employment and husbands' lack of participation in childcare could erode the potential beneficial effects.

Some researchers provide different arguments concerning the accumulation hypothesis. Verbrugge (1983) argued that people with both job and family roles enjoyed only the combination of health benefits of each role and experienced no special health disadvantage from being so busy. In other words, the combination of job plus family responsibilities has no substantial effects on health, either negative or positive. She suggested that social selection of healthier people into multiple roles might explain the beneficial effects. Harenstam and Bejerot (2001), on the other hand, argued that only in families where both partners are employed and share the domestic work and financial responsibilities did men and women both enjoy greater psychological and physical well-being.

Contrary to the Role Accumulation Hypothesis, the Role Strain Hypothesis proposes that multiple roles cause role overload and role conflict that contribute to increased stress and excessive demands on time, energy, and psychological resources that then result in poorer health (Verbrugge 1986; Waldron and Jacobs 1989; Waldron and

Weiss 1998). Blane, Berney, and Montgomery (2001) found that domestic labor on its own did not strongly predict health. However, the combination of domestic labor and paid employment was associated with women's poorer health. Studies conducted by Voss, Floderus, and Dierichsen (2004) also suggested that a high total workload from paid and unpaid work was associated with greater job absence due to illness among women. Bratberg, Dahl, and Risa (2002) argued that women combining careers with children constitute a selected group with better health. However, when sample selection was adjusted, they found number of children to be associated with women's absence due to illness.

According to the Role Strain Hypothesis, employed single mothers are most likely to experience strain from combining their work and parental roles. They have neither financial nor emotional support of a partner to ease the burden of childcare and domestic responsibilities (Marcran et al. 1994) Macran, Clarke and Joshi (1996) found single mothers with dependent children had particularly poor health, but this was confined to those with full-time employment.

Rather than just focusing on health impacts of the number of roles, some studies investigate the effects of various combinations of work and family responsibilities on health. Results suggest that the effects of multiple roles on health vary depending on gender, the nature of family roles, and the characteristics of employment. The health effects of combining work and family roles are more significant for women than for men (Hewitt, Baxter, and Western 2006; Janzen and Muharjarine 2003). In addition, marriage is found to produce more health benefits for women who are not employed than those who are employed (Arber 1991). For women, while combing full-time employment and children has a detrimental impact on health, combining children with part-time work or no-employment has a beneficial health effects (Hewitt, Baxter, and Western 2006).

Accordingly, a number of researchers contend that, in order to better understand the impacts of multiple roles on health, more specific characteristics of the social roles examined are required (Fokkema 2002; Janzen and Muharjarine 2003).

Lu and Yi (1998) argued that the expanded employment opportunities for women present the possibility of an adjustment via a division of household labor, Taiwanese women still spend much more time on housework than do men. In addition, there is small difference in time spent on housework between working women and housewives. Table 2.2 demonstrates that employed women spend only two hours less per day on domestic labor, which implies that the total workload for employed women, when combining paid labor and housework, is likely much larger than for housewives.

Table 2.2. Hours Spent on Housework Per Day for Married Taiwanese Women Aged 15 to 64 in Year 2003

	Total	Taking care for elderly	Taking care for children	Other housework
Total	**4.98**	1.92	0.22	2.84
Employment Status				
Employed	**4.01**	1.52	0.14	2.34
Unemployed	**4.46**	1.37	0.09	3.00
Not in labor force	**6.01**	2.35	0.31	3.35

Source: Directorate-general of Budget, Accounting and Statistics, Executive Yuan, Taiwan. 2003. "National Statistics: Women's Marriage, Fertility, and Labor Participation Survey"

Existing research suggests that multiple roles are associated with stress and poor health for Taiwanese women. Cheng and Chen (1995) examined the association between life stress and health for married working women. Results showed that working women experienced huge stress. Work overload and children's discipline were identified as the sources of stress women find most difficult to handle, and life stress is significantly associated with poorer health. However, since no housewives were included in that study,

we are not able to conclude whether multiple roles are associated with poorer health for women, in general.

To summarize, women are more likely than men to face conflict between employment and family roles. As discussed earlier, two hypotheses are proposed to explain health effects of multiple roles. The role accumulation hypothesis posits that the benefits of role accumulation on health can outweigh the disadvantages caused by multiple roles. The role strain hypothesis, on the other hand, proposes that multiple roles cause role overload and role conflict that contribute to increased stress and excessive demands on time, energy, and psychological resources that then results in poorer health Although empirical evidence has been found to support each of these hypotheses, existing studies provide limited discussion on how health effects of multiple roles could vary in different contexts. Potentially important contexts include whether a person is male or female, the type of employment, the nature of family roles, and stage in the life course. Multiple roles and different combinations of roles may affect individual health differently. Studies in Taiwan suggest that working women may have a greater total workload than housewives, but the health effects of multiple roles for Taiwanese women remain to be identified.

6. GENDER ROLES WITHIN FAMILY BUSINESS IN TAIWAN

Facing the challenge of the incompatibility of work and family roles, Taiwanese women usually shift from formal to informal employment (Lu 1992; Yi and Chien 2002). Lu (1992) analyzed data from the 1980 Taiwan Knowledge, Attitude, and Practice Survey which included 3,859 married or previously married women. Results showed that married women's work patterns in terms of formal vs. informal employment are the result of the division of labor by sex in both the family and the labor market.

Yi and Chien (2001) indicated that women chose informal employment in order to take care of children and household. Among informally employed women, many work for a family business established by the husband's family. They argued that "This implies that the continual employment patterns of Taiwanese women is a compromise between demands from both family and work institutions, much more salient than the effect of women's human capital and personal work attitudes." (2001: 149)

It is widely recognized that networks of small family firms in manufacturing have made a significant contribution to Taiwan's development. Greenhalgh (1994) argued that the proliferation of family firms in Taiwan since the late 1960s was the result of Taiwanese entrepreneurs' reaction to three intense political economic pressures: exclusionary ethnic politics, competition in the global economy, and biased state policies. Government positions and political power were controlled by mainlanders and excluded the Taiwanese majority. Ambitious Taiwanese thus pursued economic mobility in the business world. In addition, when facing the highly competitive world economy, exploitation of unpaid and low-paid family labor was a strategy to keep costs down. Also, networks of small family firms were found to be flexible and efficient in response to the economy (Buck 2000). Furthermore, because of its experience in mainland China, the Nationalist state pursued anti-big business policies. Therefore, it was difficult for firms to outgrow their small, familistic size. The large number of family firms provides an alternative for married women to stay in the labor force. According to the "Human Resource Survey" (DGB 2004), among all employed women, 12.90% worked for a family business. Also, among all familial firms employees, 77.19% were women.

Gender roles in family firms are found to be similar to traditional family roles. Drawing on historical information gathered from 25 Taiwanese enterprises in the 1970s, Greenhalgh (1994) contended that the division of labor by gender and generation in

family firms is a recreated traditional form for family/firm heads to face challenges from contemporary society. Lu (1996) investigated 29 family firms in Taiwan and concluded that women's roles in family firms were an extension of their family roles. While men were in charge of "exterior" matters such as contacting customers or taking orders from them, women are responsible for administration of the firms. In addition, women also extend their roles of establishing emotional linkages among family members to the roles of maintaining good relationships with customers and other collaborative firms. Men are primary decision makers. Women's subordinative roles are reinforced in family firms.

Although gender disparity in the distribution of work and reward are found in family firms (Greenhalgh 1994), the power relation between men and women in these firms seems to be constantly changing. Lu (2001) conducted a survey of 302 small family businesses in various industries in Taiwan to study the status of "boss's wife" in family firms. She found the power relations between gender and "boss's wife's" status are "determined by the demands of a family production system rather than the reproduction system." (2001: 163). Through application of survival economic strategies, including institutional rules and a gender-based labor division, the wives establish bargaining power and go against patriarchal norms. She concluded that "boss's wife" status is the consequence of gender construction, through which work-related power relations and gender roles (for both husband and wife) are mutually shaped. This kind of interaction does not happen in a non-familial firm. In addition, compared to those employed in non-family firms, women working for family businesses may enjoy more flexibility in balancing their responsibility for family with a paid job. As women's roles in family business are the extensions of their family roles, it is expected that the male employers (usually the family heads) will be more understanding and lenient if the related female workers need to take time off to carry on their family responsibilities. As an income gap

and inequality of division of labor may contribute to women's poorer health status, and flexibility in work responsibility may decrease women's stress caused by role conflict. It is uncertain how these complex relationships impact health for familial employed women.

To summarize, according to existing studies, working in family firms for Taiwanese women could be a compromise between demands from family and work. Women's work roles in family firms could be also an extension of their family role. It remains unclear whether the characteristics of role extension would help women cope with conflict between work- and family roles and then in turn have different health effects compared to those who work in non-familial businesses.

7. GENDER DIFFERENCES IN HEALTH AMONG DIFFERENT AGE GROUPS

The pattern of gender differentials in health has been found to vary for different age groups. The differences vary in direction and magnitude depending on the specific health measures examined. Gender differences in self-reported health are usually found to shrink with age. Verbrugge (1985) indicated that men reported better health than women, but the gap became smaller among people aged 65 and older. Ross and Bird (1994) also found that younger women tend to report significantly worse health than men; however, the size of difference decreases with age. Some studies have documented that gender differences in self-reported health become insignificant after certain ages (Arber and Cooper 1999; McCullough and Laurenceau 2004; Macintyre et al. 1996). On the other hand, the rate of disability has been consistently found to be higher among women (Lubitz et al. 2003: Merrill et al. 1997; Newman and Branch 2001). Gender differences in functional limitations become greater among the elderly (Gorman and Read 2006; Marks 1996; Merrill et al. 1997).

In Taiwan, gender differentials in prevalence of some chronic diseases have been found to vary with age. For instance, Table 2.3 shows that prevalence of hypertension and diabetes among women increases more rapidly than men's after middle age**.** The prevalence of hypertension is higher among male adults compared to female adults (28.5% versus 19.6%), but among the elderly age 65 or above, fewer men have hypertension compared to women (50% versus 62%). Also, women exhibit higher prevalence of diabetes across adulthood, and the magnitude of gender differentials increases with age. The patterns of these differentials are found to be associated with

Table 2.3. Distribution of Body Mass Index (BMI) and Prevalence of Hypertension and Diabetes by Sex and Age

	Men	Women
BMI ≥ 26.4[4]:		
(19+ yr-old)	14.6%	15.8%
(45+ yr-old)	18.3%	29.16%
Hypertension:		
(19+ yr-old)	28.5%	19.6%
(45+ yr-old)	44.4%	41.8%
(65+ yr-old)	50.0%	62.0%
Diabetes:		
(19+ yr-old)	3.2%	5.5%
(45+ yr-old)	7.2%	14.8%
(65+ yr-old)	7.6%	22.0%

Source: Bureau of Health Promotion, Department of Health, Taiwan. 1996. "Nutrition and Health Survey in Taiwan"

higher proportions overweight among elderly women (Pan et al. 2003). Shaw's research in1993 suggested that the age-specific mean values of lumbar spine bone mineral density (BMD) were higher for men than for women after age 60. He indicated that the BMD of women declined significantly after age 40, but the BMD of men did not show a

[4] BMI ≥26.4 was defined as obesity in 1996 in Taiwan. In 2002, Taiwan's Department of Health announced a new standard of obesity as BMI ≥ 27.

downward trend with age. Furthermore, Ofstedal, Zimmer and Lin (1999) suggested that, among older people in Taiwan, women are more likely to have lower cognitive functioning.

In sum, evidence shows that the patterns of gender differences in health vary by age and by health measures employed. Gender differentials in certain health statuses may either increase or decrease as people age. As Arber and Cooper (2000) suggested, gender roles and expectations are socially constructed regarding chronological age, so that social determinants of health for men and women are likely to vary among different age groups.

8. RESEARCH HYPOTHESES

Existing studies show that, in Taiwan, women are more likely than men to maintain a healthier life style, but how then can one explain why women tend to report poorer health than men? Prior research in Western societies suggests that social factors such as education, employment, and family roles are associated with individuals' health status. Education increases individuals' control over their lives and enables them to lead a healthier lifestyle. Employment can increase household income, decrease economic hardship, provide health insurance, and offer access to more affordable health care services; all of these functions should improve an individual's physical wellbeing. Marriage and parenthood provide individuals with financial and emotional supports and in turn enhance physical health. On the other hand, the burden of domestic labor such as eldercare and housework may cause stress and illness. Compared to men, women are more likely to experience lower educational attainment, lower chances of employment, and a greater share of domestic work. The relatively disadvantageous socioeconomic status of women in general may result in poorer health compared to men. Accordingly, current gender stratification in the three factors in Taiwan society could possibly contribute to existing gender differentials in health.

In addition, some studies show that the pattern of associations among social factors and health may be different between men and women. For instance, the combination of work and family roles could cause work overload for women but not for men. While the role accumulation hypothesis and role strain hypothesis predict the opposite health impacts of multiple roles, studies that employ these two theoretical explanations provide only limited discussion on how health effects of multiple roles vary in different contexts. Work roles in Taiwanese family firms are found to be extensions of family roles, but the health impacts of working in family business remain uncertain. Moreover, the degree of gender differentials in health is found to vary by age and the health measure examined.

Only limited investigations have been conducted to address gender differences in health in Taiwan. Accordingly, this research intends to determine impacts of education, employment, and family roles on gender differentials in health among Taiwanese adults. In addition, this research will compare gender differences in patterns of association between risk factors and health status. Finally, this research will examine certain possible mediators between work and health in order to explore mechanisms between familial/non-familial employment and health for men and women in Taiwan.

Based on the literatures reviewed, I posit four hypotheses regarding the relationships among gender, age, education, employment, family roles, and adult physical health:

Hypothesis 1: Gender differentials in health among Taiwanese adults are associated with gender stratification on education, employment, and family roles in Taiwan society. Thus, women's overall disadvantageous social status leads them to report poorer health than do men.

Hypothesis 2: Gender differentials in health and the patterns of association between health and work- and family- roles will vary among people at different stages of the life cycle and for different health measures.

Hypothesis 3: Women are more likely than men to experience negative health effects of a combination of work and family roles, but the health impacts vary among those working in family firms and in other types of businesses.

Hypothesis 4: The health effects of types of employment are mediated through psychosocial factors related to role strain.

CHAPTER 3: DATA AND METHODS

1. OVERVIEW OF THE RESEARCH DESIGN

This research has two general purposes. The primary purpose of this study is to examine how education, employment, and family roles are related to gender differentials in health for Taiwanese adults and across different age groups. The main research questions under the primary purpose are:

1) How do education, employment, and family roles contribute to gender differences in health status?
2) Do the effects of education, employment, and family roles on health exhibit different patterns for men and women in general?
3) Does the magnitude of gender differentials in health vary across age groups?
4) Do the effects of education, employment, and family roles on health vary among age groups for men and women?
5) Are multiple roles associated with better or poorer health status? Which hypothesis, role accumulation or role strain, can better explain the effects of multiple roles on health?
6) Do the effects of multiple roles on health vary among types of employment?

The other general objective of this study is to explore the mediating mechanisms between types of employment and health status for men and women in Taiwan. The research questions under the secondary purpose are:

1) What factors may mediate the effects of different types of employment (e.g., self-employed, familial employed, or non-familial employed) on health?
2) Are the mediating mechanisms between types of employment and health the same for men and women in general?

3) Do the mediating mechanisms between types of employment and health vary across age groups for men and women?

2. SPECIFIC METHODS EMPLOYED

Because the dependent variables, the three health measures, in this research are all coded as binary variables (explained in detail in the data section), I employ binomial logistic regression models to examine the associations between social factors and health status. The SPSS program is used to estimate all the regression models. The technique of progressive adjustment (Mirowsky 1999) is applied in model construction. That is, baseline models of gender and each health measure are first estimated. Other social factors are then included progressively to clarify if they can account for gender differences in health. In order to prevent including too many interaction terms in regression models, interaction effects between gender and social factors are examined by fitting separate models for men and women. In addition, in order to examine gender-by-age effects on health, if cell size permits, separate models for different age groups within each gender will be estimated (explained in detail at the analytical strategy section).

3. DATA

Two different samples are adopted for analyses for the two general research purposes. The two samples are data drawn from different years of the Taiwan Social Change Survey (TSCS). The TSCS is conducted by the Institute of Sociology, Academia Sinica in Taiwan to serve the purpose of providing national representative data files for research on social change in Taiwan. All data were collected in the mode of face-to-face interviews. The first TSCS was conducted in 1984 and l985. In 1990, a longitudinal survey project with a five-year term was planned. The same sampling method of "Probability Proportional to Size" (PPS) is applied for all TSCS, so combining survey

data from different years should not be a problem. Weights are provided along with each data set. The weights are generated by the Center for Survey Research (CSR), Academia Sinica to make the sample distribution better fit the population distribution. CSR calculated the weights according to the population distribution by sex, age, residential area (urban/rural), and education levels in the year that survey data was collected. Weighted data are used to calculate descriptive statistics. Analytic models are estimated twice: with weighted data and with unweighted data followed by a comparison of results. Since results from weighted and unweighted data are almost identical (examples are provided in the Appendix A), this dissertation reports only results calculated from the weighted data.

In the rest of this research, the sample used for the primary purpose is termed as "the main data set," and the sample used for the secondary purpose is referred to as "the supplementary data set."

A. The Main Data Set

The main data set is drawn from the second questionnaire of the first survey of the fourth cycle (TSCS 4.1, Q2) and the first questionnaire of the third survey of the fourth cycle (TSCS 4.3, Q1). TSCS 4.1, Q2 was conducted from July 10th to September 15th in year 2000 and contains 1,895 cases. TSCS 4.3, Q1 was conducted from July 15th to August 19th in year 2002, and contains 1,992 cases. Therefore, the combined sample, i.e., the main data set, contains 3,887 cases. Subjects in the main data set are uninstitutionalized Taiwanese adults aged 18 and above.

For most variables included in analyses, proportions of missing values are less than 0.1%. About 6% of cases contain missing values on family income. Given the small amount of missing data, cases with missing information are deleted. Only one variable, family income, has more than 5% missing information. In this case, a "missing category"

is assigned. There are 39 cases containing missing values on variables other than family income. These cases are left out of the sample, and the final unweighted sample size for the main data set is 3848.

a. Dependent Variables

The primary purpose of this dissertation is to examine the association between social factors and gender differences in health. Gorman and Read (2006) argued that multiple health measures should be applied in empirical health studies because gender differences in health may vary by health outcomes examined. Accordingly, three health measures are used in the main data set: presence of chronic diseases, life affected by illness in the past two weeks, and self-rated health.

Chronic diseases are commonly studied in health research. Macintyre, Der, and Norrie (2005) suggested that chronic illness can be used in epidemiology and health studies without major socioeconomic bias, for there was no evidence showing that more disadvantaged social groups have higher thresholds for defining illness. Chronic conditions such as arthritis, diabetes, cerebrovascular disease are significant predictors of functional limitation, especially for the elderly. Dunlop and colleagues (2002) contended that higher incidence rates of moderate functional limitations among older women, compared to their male counterparts, can be explained by the higher prevalence of chronic conditions among women. Additionally, men and women exhibit different patterns of prevalence of chronic diseases. Female life expectancy was found more affected by diabetes, arthritis, and physical inactivity, while diabetes, smoking, and arthritis, and cancer affected men most (Belanger et al. 2002). The question used in this study to measure chronic disease is: “Do you currently have any chronic disease?” The response of “yes” is recoded to 1, “no” to 0. Table 3.1 shows that 22.8% of respondents

report having at least one chronic disease. Note that men report better health on all three outcome variables.

Table 3.1. Distribution of Health Measures Examined in This Study (weighted)

	Men	Women	Total
Chronic disease			
Yes	21.9%	23.6%	22.8%
No	78.1%	76.4%	77.2%
Life affected by illness in the past two weeks			
"A very strong effect."	2.0%	3.3%	2.7%
"A strong effect"	4.2%	5.9%	5.1%
"A little bit effect"	11.6%	18.4%	15.0%
"No effect"	82.2%	72.3%	77.1%
Self-rated Health			
"Very poor"	1.9%	3.9%	2.9%
"Poor"	12.6%	20.1%	16.4%
"Good"	51.8%	52.6%	52.2%
"Very good."	33.7%	23.5%	28.5%

Source: TSCS 4.1Q2 and 4.3Q1

"Life affected by illness in the past two weeks" is one of the core measures of health-related quality of life (National Center for Chronic Disease Prevention and Health Promotion 2006). The measure is applied to track changing quality and years of healthy life and degree of health disparities. Gender differences in health-related quality of life is found to be associated with illnesses like chronic cough, headache, musculo-skeletal pain, and asthma. Compared to men, women in general report poorer health-related quality of life (Belloch et al. 2003; Bingefors and Isacson 2004; French, Fletcher, and Irwin2004, 2005; Vuletic and Mujkic 2003). Bingefors and Isacson (2004) indicated that there are significant gender differences in the prevalence and severity of self-reported pain. They argued that biological factors may explain some of the differences, but the main differences result from gender disparities in work, the economy, daily living conditions, social life, and expectations. In addition, social determinants of physical pain differ by

sex. While education and unemployment are important for men, economic difficulties, part-time work, and being married are more important for women. In this study, the question addressing life affected by illness in the past two week is: "During the latest two weeks, how much was your daily life affected by any illness?" Responses to this question consist of four categories: "no effect," "a little bit effect," "a strong effect," "a very strong effect." Table 3.1 shows that 77.1% of respondents answer "no effect." In order to prevent the problem of small cell size in analysis, I collapse the response categories other than "no effect." Thus, the "no effect" is recoded to 0, and the other three are collapsed and recoded to 1.

Self-rated health is one of the most frequently used health status measures in survey studies. Idler and Benyamini (1997) argued that self-rated health is an inclusive and accurate measure of health status and health risk factors. The major determinants of self-rated health include the frequency of falling ill, the number of chronic illnesses, sleep quality, and minor psychiatric morbidity (Cheng and Chan 2006; Singh-Manoux et al. 2006).

Although some research illustrates that the frame of reference used to evaluate one's health status may vary by age and education (Krause and Jay 1994), self rated health has proved more valid and reliable in predicting mortality than most other health measures (Gold, Franks, and Erickson 1996; Lundberg and Manderbacka 1996; Miilunpalo et al. 1997; Rogers et al. 2000). Idler and Benyamini (1997) reviewed twenty-seven studies in U.S. and international journals and discovered that self-ratings of health reliably predicted survival in populations even when known health risk factors were controlled. They suggested that self-rated health is a dynamic evaluation based on both past and current levels of health. In addition, self-rated health reflects the presence or absence of resources that can affect decline in health.

The effect of self-rated health on mortality has been found to vary by gender. Most studies show that the association between self-rated health and mortality is stronger in men than in women (Idler and Benyamini 1997; Deeg and Kriegsman 2003; Spiers et al. 2003). Some evidence, on the other hand, suggests that this association is strongest among elderly women (age 75-84), compared with elderly men and with the oldest-old (age 85-94) women and men (Benyamini et al. 2003). Idler and Benyamini (1997) suggested that the stronger association between self-rated health and mortality in men may be because men typically have more serious illnesses. For that reason, men are more aware of these illnesses and are more likely to die prematurely from them. However, this argument was not supported by later empirical evidence (Spiers et al. 2003). The question addressing self-rated health in this study is: "How do you evaluate your health in the past two weeks?" Response to this question consists of four categories: "very good," "good," "poor," and "very poor." Table 3.1 illustrates that only 2.9% of respondents evaluate their health status as "very poor," and 16.4% of them report "poor" health. More than 80% of people evaluate their health as "good" or "very good." To address the problem of small cell size in estimating regression models, I recode original responses to a dichotomous variable of "poor health". The responses of "poor" and "very poor" are recoded to 1, and "good" and "very good" are recoded to 0.

b. Independent Variables

With the intention of evaluating the social impacts on health status for Taiwanese men and women, this project regards education, employment, and family roles as the three primary explanatory factors of gender differences in health. To identify net effects of these explanatory variables, I control basic sociodemographic and behavioral variables that are available in the main data set. Certain interaction terms are then applied to test the possible impacts of multiple roles on health.

The three primary explanatory factors in the main data set are education, employment, and family roles. Education is measured by the highest degree the respondent attained. According to the categories used by Directorate-general of Budget, Accounting and Statistics in Taiwan, individuals' highest degrees are classified and recoded to three dichotomous variables: junior high school or below, senior high school, and junior college or above. The category of "junior high school or below" serves as the reference group. This coding method of education is applied to all age groups except the oldest one. Considering the lower educational attainment for the older generation compared to the younger ones, education is recoded to "no formal education," "elementary school," and "junior high school or above" for the elderly. "No formal education serves as the reference group for this oldest age group.

In order to investigate the impacts of employment on health in general and compare the respective health effects of different types of employment, I collapse those who are not in the labor force and who are unemployed into the category of "not currently employed" and treat this as the reference group. Three dichotomous variables are then used as measures of types of employment: self-employment, employed in family firms (labeled as "familial employed"), and employed in non-familial firms (labeled as "non-familial employment"). Compared to the United States, Taiwan society is less diverse in terms of race, ethnicity, immigration, and region (Liu and Sakamoto 2005). Therefore, when examining the effects of Taiwan's education system and labor force on health, unobserved heterogeneity is expected to be a relatively small problem.

The measurement of family roles consists of three sets of indicators: conjugal role, parental role, and filial role. As the measure of conjugal role, marital status is recoded to a dummy variable (married =1, otherwise =0). Parental role is measured by two variables: the number of unmarried children living in the same household and the

married children living in the same household. Filial role is measured by the number of parents and parents-in-law living together in the same household.

Sex and age are two basic demographic variables and are controlled in every regression model. When I construct dummy variables for analyses, I consistently code advantageous categories, such as employed and highly educated as 1, so as to prevent confusion while reporting results. Because men in general report better health status than women, sex is recoded to "male" (yes =1, no =0). Age is coded as years since the individual was born. In addition, for analytical purpose (explained in detail in the analytical strategy section), age is used to create three age groups for the respondents: the young adults (age 18 to 44), the middle aged (age 45 to 64), and the elderly (age 65 or over).

Family income is included to show the effects of financial resources on health. Monthly family income consists of 22 levels, from 0 NTD (i.e. New Taiwan Dollar; 1 NTD ≈ 0.03 US$) to 200,000 NTD or above. It is recoded to four quarters of income level (based on the income distribution in each age group). The lowest income level (i.e., the 1st quarter) is regarded as the reference group. The 2nd, 3rd, and 4th quarters are represented by one recoded dummy variable (yes =1, no =0). As mentioned previously, there are about 6% cases containing missing family income. Therefore, a missing category is established.

Smoking and alcohol consumption, are controlled for analyses of the main data set. The impacts of these two behaviors on health have been documented in numerous studies. Cigarette smoking is associated with adverse health and mortality consequences (Friend et al. 1993; Hummer et al. 1998; Nam et al. 1994; Peto et al. 1995). Alcohol abuse has morbid and mortal impact on individuals (Gordon and Doyle 1988; Thun et al. 1997), but mild drinking is found to benefit health (Marmot et al. 1981). The question

addressing drinking is: "Do you drink alcohol?" Responses to the drinking question consist of four categories: never; sometimes; drink often, but seldom get drunk; and drink often and often get drunk. I combine the first two categories ("never" and "sometimes") to form the measure of "non- or mild-drinkers". The two groups of "drink often" are recoded to 0 and set as the reference group. This way of coding for alcohol drinking is applied when the three age groups are analyzed together. When each age group is analyzed separately, the same way of coding is applied to the two younger age groups, but not to the oldest group (age 65 or over). Because very few elderly respondents reported "drink often," I can only differentiate the drinkers and non-drinkers when conducting analysis for this group.

The question addressing smoking is: "Do you smoke cigarettes? If you do, how many do you smoke per day?" Responses to the smoking question consist of seven categories: (1) never, (2) one or two cigarettes, (3) less than half a pack, (4) about half a pack, (5) about one pack, (6) about two packs, and (7) more than two packs. Since 71.4% of respondents report they do not smoke, and preliminary results show no significant differences in health between non-smokers and mild smokers (smoke less than one pack per day), I construct a dummy variable for smoking by recoding categories (1) – (4) as 1 (labeled as "mild or non smokers"), and categories (5) – (7) as 0 (labeled as "heavy smokers").

It would have been useful if I could control physical exercise, for prior studies have documented positive health effects of exercise (Hakim et al. 1998; Kaplan et al. 1987; Paffenbarger et al. 1986). Unfortunately, the main data set does not contain this variable.

c. Interaction Terms

In order to examine the impacts of multiple roles on health, I test 15 two-way interaction terms constructed by multiplying marital status, living arrangement, or types of employment: (1) married by self-employment, (2) married by non-familial employment, (3) married by familial employment, (4) married by number of parents/in-laws living together with the respondent, (5) married by number of unmarried children living together with the respondent, (6) married by number of married children living together with the respondent, (7) number of parents/in-laws living together with the respondent by self-employment, (8) number of parents/in-laws living together with the respondent by non-familial employment, (9) number of parents/in-laws living together with the respondent by familial employment, (10) number of unmarried children living together with the respondent by self-employment, (11) number of unmarried children living together with the respondent by non-familial employment, (12) number of unmarried children living together with the respondent by familial employment, (13) number of married children living together with the respondent by self-employment, (14) number of married children living together with the respondent by non-familial employment, and (15) number of married children living together with the respondent by familial employment. Inasmuch as certain family roles are more important at different stages of the life course, I test different sets of interaction terms for each age group. For the young adults (age 18 – 44), interaction (1) – (5) and (7) – (12) are tested. Since it is unlikely that these young people have married children, interactions constructed for "living with married children" are left out. For the middle aged (age 45 – 64), I test all 15 interactions. For the elderly (age 65 or over), I test interactions (1) – (3), (5) – (6), and (10) – (15). People in this age group usually do not have parents alive, so interactions made with "number of parents/in-laws living together" are not included. When analyzing

the sample containing all ages, interactions terms tested are the same as those for the young adults because young adults is the largest age group among the three.

When results of analyses are presented in the following chapters, only interaction terms exhibiting significant effects are included (following the full model in each table). Models with insignificant interaction terms are not reported. Two odds ratios can be derived from each significant interaction terms. Each of these two odds ratios is calculated by multiplying the exponential coefficient of the interaction term and the exponential coefficient of one of the two variables that comprises this interaction term. For instance, the interaction term "married-by-familial employment" is constructed by multiplying the variable "married" by variable "familial employment." If this interaction term exhibits a significant exponential coefficient $Exp\ (\beta_3)$, and the exponential coefficients for married and familial employment are $Exp\ (\beta_1)$ and $Exp\ (\beta_2)$, respectively, two odds ratios are calculated as [$Exp\ (\beta_3) * Exp\ (\beta_1)$] and [$Exp\ (\beta_3) * Exp\ (\beta_2)$]. Say the dependent variable is reporting at least one chronic disease. The first product is interpreted as the odds of reporting at least one chronic disease for married familial employed individuals relative to unmarried familial employed individuals. The second product is interpreted as the odds of reporting at least one chronic disease for married familial employed individuals relative to married but not currently employed individuals. Also note that the "number" of children and parents/in-laws are measured in interaction terms. Thus, interpretations of these effects on health should be the impact of "an additional child" or "an additional parent/in-law", not just the impact of "having children" or "having parents/in-laws".

B. The Supplementary Data Set

The supplementary data set is drawn from the second questionnaire of the third survey of the fourth cycle (TSCS 4.3, Q2), and contains 1,228 cases. TSCS 4.3, Q2 was

conducted during July 15th to October 7th in year 2002. Subjects in the supplemental data set are Taiwanese adults aged from 18 and above who are currently employed. Because TSCS 4.3, Q2 contains different questions from the two surveys in the main data set, it is not possible to combine TSCS 4.3, Q2 into the main data set.

For most variables included in the analysis, proportions of missing values are less than 3 %. About 18.6% of cases contain missing values on frequency of physical exercise. Given the small amount of missing data, cases with missing information are deleted, except missing frequency of physical exercise, for which a "missing" category is included. The final unweighted sample size for the supplementary data set is 1,167.

a. Dependent Variables

The purpose of using the supplementary data set is to explore the mechanisms between types of employment and health. The only health measure in the supplementary data set is life affected by illness in the last two weeks. The coding of illness in the past two weeks is the same as that described before.

b. Independent Variables

The major independent variable in the supplementary data set is types of employment. Individuals' types of employment consist of self-employment, familial employment, and non-familial employment. Because only the employed are included in the supplementary data set, the category of non-familial employment serves as the reference group. The other two types of employment are coded as dummy variables (yes =1, no =0).

Two variables are proposed as possible mediators between types of employment and health status: hours of employment per week and a role strain index. Hours of employment per week are measured directly from respondents' answers. The value of

role strain index is calculated from responses to four items. The questions are "How often did you experience the following situation in the past three months?" The four situations are: (1) I was too tired to do housework after coming back from paid employment; (2) It was hard to take family responsibility because I spent too much time on paid work; (3) I was too tired to devote sufficient time to employment because of fatigue resulting from doing housework; and (4) It was hard to focus on paid employment because of my family responsibility. Available responses to these four situations include: "never" (scored 1), "once or twice in the past three month" (scored 2), "several times per month" (scored 3), and "several times per week" (scored 4). The role strain index is the average score of the four situations and ranges from 1 to 4. A score close to 1 represents experiencing a low level of role strain, and a score close to 4 represents experiencing a high level of role strain. Internal consistency for this four-item scale is 0.74 (standardized Cronbach's alpha).

Seven sociodemographic factors controlled in this part of the analyses are: age, sex, education, marital status, number of parents/in-laws living together with the respondent, number of unmarried children living in the same household, and family income. These seven variables are measured in the same way as mentioned in the prior section. Unlike the main data set, the supplementary data set does not contain the variable of number of married children living together in the same household, so it cannot be included in the analysis.

The frequency of strenuous physical exercise per week is controlled in the full model. The question asks "How often do you engage in strenuous physical exercise per week?" Responses included (1) "less than once ," (2) "once a week," (3) "2 – 3 times per week," (4) "4 –6 times per week," and (5) "7 or more per week." The preliminary analysis suggests that the effect of frequency of physical exercise on health is not likely

to be linear. Therefore, I collapse categories (2) – (3) to form a new dummy variable "1 – 3 times a week" and (4) – (5) to form "4 or more per week." The category (1) is used as the reference category, and a missing category is assigned.

c. Interaction Terms

In order to test the health effects of multiple roles, six two-way interaction terms are constructed in the supplementary data set as follows: (1) married by self-employment, (2) married by familial employment, (3) number of parents/in-laws living together with the respondent by self-employment, (4) number of parents/in-laws living together with the respondent by familial employment, (5) number of unmarried children living together with the respondent by self-employment, and (6) number of unmarried children living together with the respondent by familial employment. All of these six interactions are tested among young adults and the middle aged. For the elderly, only interactions (1) – (2) and (5) – (6) are tested. Since it is unlikely that the elders have parents or in-laws alive, interactions related to parents/in-laws living together are left out for this oldest group. For the analyses for the whole sample, the six interactions are all included. Only interaction terms exhibiting significant effects are included. Models with insignificant interaction terms are not reported. The way to calculate and interpret the significant interaction effects are the same as described for the main data set.

4. ANALYTICAL STRATEGY

A. Strategies Employed to Achieve the Primary Purpose

In the main data set, three measures are employed to assess health status for Taiwanese adults. For each health measure, regression models are first estimated for the whole sample to demonstrate a general pattern of gender differentials in health and the social factors contributing to this social phenomenon. To facilitate the gender comparison

of the association between health status and work- and family- roles, men and women are then analyzed separately. The differences between men and women in significant social determinants of health are tested for those variables exhibiting significant health effects in full models for both men and women. This can be set up as a two-tailed hypothesis test where H_0: $\beta_i^{women} = \beta_i^{men}$ versus H_a: $\beta_i^{women} \neq \beta_i^{men}$. The test statistic is $t = (b_i^{women} - b_i^{men}) / [(SE_i^{women})^2 + (SE_i^{men})^2]^{½}$.

The sample is then divided into three age groups: the young adults (age 18 – 44), the middle aged (aged 45 – 64), and the elderly (aged 65 or above). In each age group, the associations between social factors and each health measure is examined by three sets of regression models: one for the whole group, one for women, and one for men. By applying this procedure, I am able to identify general and gender-specific social determinants of health within each age group, and compare the patterns of gender differences in health across different age groups.

In order to examine whether gender differentials in health increase or decrease with age, I have tried two ways of examining the age-by-sex effects. The first way is to include an age-by-sex interaction term and apply the technique suggested by Ross and Bird (1994) to see whether there is a crossover of health status between men and women at certain ages (see Appendix B). The second way is to divide the sample into three age groups (18 – 44, 45 – 64, and 65+) and estimate regression models for each of them. Since in preliminary work, I did not find a significant effect for the age-by-sex interaction on any health measure examined in this research[5], I adopted the second method. Since the sizes of certain age-by-sex groups are small (e.g., only 243 for the elderly male, and 242

[5] The self-rated health and life affected by illness in the past two weeks are coded as continuous variables when testing the significance of this interaction term.

for the elderly female), caution must be exercised when interpreting regression coefficients for these groups

The model construction for each health measure, in each age-by-sex group, follows the same procedures. Explanatory and control variables are added into regression models progressively. To observe substantial effects of the aging process on health for both men and women, age is adjusted in the baseline model for every group. To distinguish net effects of each social factor on health, education, employment, and family roles (including marital status and living arrangements with parents/in-laws and children) are included in regression models individually in sequence. Certain socioeconomic (such as family income) and behavioral variables (such as smoking and drinking) are then progressively controlled. Finally, different sets of interaction terms are tested for different age groups.

B. Strategies Employed to Achieve the Secondary Purpose

I apply the "life affected by illness in the past two weeks" as the health measure in the analysis for the supplementary data set. The age-by-sex subgroups are set up for the two younger groups, but not for the oldest age group (age 65 or above), for the sample size of this age group is relatively small. Specific interaction terms (e.g., female-by-married) are tested in this age group to examine whether gender interacts with certain social factors examined. Gender differences in the effects of significant social determinants of health are tested within each age group, and the patterns of gender differences in health across different age groups are compared.

Progressive adjustment is also applied in the model construction process for the supplementary data set. In order to explore the mediating mechanisms between types of employment and health status in Taiwan, certain psychosocial factors such as the role strain index are included to test whether they can account for the association between

employment and health. Finally, the six interaction terms are added to test the impacts of multiple roles on health.

CHAPTER 4: RESULTS FROM THE MAIN DATA SET

1. GENDER DIFFERENCES IN SOCIAL CHARACTERISTICS AND HEALTH CONDITIONS

A. Overall Differences

Table 4.1 presents the distribution of social and behavioral factors for adult men and women in Taiwan. As in many other societies, we find that men in general are in a higher socioeconomic position than are women (Table 4.1). For instance, compared to women (21.11%), men (28.01%) are more likely to have a junior college or above degree. Also, more women (41.88%) than men (18.72%) are not in the labor market. The male population displays a higher proportion of unemployment (6.90%) compared to the female population (4.01%). Among men and women who are employed, the majority of both sexes work for non-familial firms. The second most common type of employment is self-employment. More men (23.87%) than women (8.34%) are self-employed. Only 6.86% of respondents reported familial employment, and the table shows a higher proportion of women (8.65%) than men (4.98%) are in this type of employment. Compared to women, men have a higher average personal income (the female/male personal income ratio is about 0.55) and live in a household with a higher average family income (the female/male family income ratio is about 0.93). As to family roles, due to the fact that women enter into their first marriage at an earlier age than men (25.7 years old for women versus 29.2 years for men in year 2000[6]), a higher proportion of women are currently married. While about 35% of men have their own parents living in the same household, less than 20% of women live with their own parents. On the other hand, compared to men, women are more likely to live with their children and parents-in-law.

6 National Statistic, Taiwan, 2000.

Table 4.1. Weighted Distribution of Sociodemographic Factors and Health Measures by Gender in Taiwan, 2000-2002.

	Men	Women		Total
Age (mean)	42.62	43.24		42.94
Educational attainment (%)				
Junior high school or below	42.10	51.22	*	46.78
High school	29.89	27.66		28.75
Junior college or above	28.01	21.11	*	24.47
Employment status (%)				
Self-employed	23.87	8.34	*	15.90
Non-familial employment	45.53	37.12	*	41.21
Familial employment	4.98	8.65	*	6.86
Unemployed	6.90	4.01	*	5.42
Not in labor force	18.72	41.88	*	30.60
Monthly income (NTD)				
Personal income (mean)	31,000	17,000	*	24,000
Family income (mean)	68,000	63,000	*	65,000
Family role factors (%)				
Married	62.95	68.14	*	65.62
Father living together	32.31	15.03	*	23.44
Mother living together	39.52	18.17	*	28.56
Father in law living together	0.26	7.92	*	4.19
Mother in law living together	0.58	11.17	*	6.01
Married son living together	10.00	14.80	*	12.50
Unmarried son living together	39.80	47.20	*	43.60
Married daughter living together	1.80	2.50	†	2.20
Unmarried daughter living together	33.70	38.5	*	36.20
Health Behavior				
Alcohol drinking (%)	57.87	21.49	*	39.20
Smoking (%)	53.43	4.97	*	28.56
Health Status				
Self rated health (mean)	3.17	2.96	*	3.06
Chronic disease (%)	21.88	23.65		22.79
Life affected by illness in the past two week (%)	26.17	40.25	*	33.39
N	1870	1971		3842[7]

Source: TSCS 4.1Q2 and 4.3Q1[8]
t-test of gender difference: † p<.10; * p<.05.

[7] Unweighted n=3848, 1896 men and 1952 women.
[8] Cases containing missing values, except for family income, have been removed from the original sample.

Table 4.1 also shows the distributions of health behaviors and health status for men and women. Compared to males, the female population has a much lower proportion who drink alcohol (21.49%, compared to 57.87% of men) and who smoke (4.97%, compared to 53.43% of men). Gender differences in health status are shown on two out of three health measures examined. While there is no significant difference of chronic disease reporting between men and women, men tend to report better self-rated health status (3.17) than women (2.96) and are less likely than women to have their life affected by illness in the past two weeks (26.17% vs. 40.25%).

B. Gender Differences within Age Groups

Tables 4.2 to 4.4 present the distribution of social and behavioral factors and health measures for men and women in the three age groups. We find that gender differences in educational attainment are smaller among young adults (Table 4.2). The gender gap of participation in the labor force is largest among the middle aged (Table 4.3). If we compare the patterns of employment across the three age groups, we find in the youngest group, that most men (59.84%) and women (51.56%) work for non-familial firms (Table 4.2). For the middle-aged group, while non-familial employment is still most popular among working women, more men are self-employed (Table 4.3). On the other hand, compared to young women (8.27%), a higher proportion of middle aged women (10.95%) work for family businesses (see Table 4.2 and 4.3). Note that in the group of people aged 65 or over (Table 4.4), a higher percentage of men (6.09%) than women (5.02%) is in family business. However, considering the percentage of men (30.77%) and women (14.95%) in the labor force, actually elderly employed women have a higher proportion working in family business than do employed men (33.58% versus 19.79%).

Table 4.2. Weighted Distribution of Sociodemographic Factors and Health Measures by Gender for People Aged 18 to 44 in Taiwan, 2000-2002.

	Men	Women	Total
Age (mean)	31.72	32.34 *	32.03
Educational attainment (%)			
Junior high school or below	25.33	27.04	26.19
High school	38.60	41.28	39.96
Junior college or above	36.07	31.69 *	33.85
Employment status (%)			
Self-employed	19.82	8.38 *	14.03
Non-familial employment	59.84	51.56 *	55.65
Familial employment	5.14	8.27 *	6.72
Unemployed	6.46	4.37 *	5.40
Not in labor force	8.75	27.43 *	18.19
Monthly income (NTD)			
Personal income (mean)	37,000	28,000 *	29,000
Family income (mean)	77,000	71,000 *	74,000
Family role factors (%)			
Married	49.69	65.75 *	57.81
Father living together	50.60	24.64 *	37.48
Mother living together	58.17	29.34 *	43.60
Father in law living together	0.43	12.10 *	6.33
Mother in law living together	0.61	16.59 *	8.69
Married son living together	0.40	0.40	0.30
Unmarried son living together	37.10	51.60 *	44.50
Married daughter living together	0.20	0.20	0.20
Unmarried daughter living together	33.40	45.0 *	39.30
Health Behavior			
Alcohol drinking (%)	66.17	30.12 *	47.95
Smoking (%)	58.05	6.25 *	31.88
Health Status			
Self rated health (mean)	3.26	3.06 *	3.16
Chronic disease (%)	10.40	12.84 †	11.63
Illness in the past two week (%)	18.14	29.83 *	24.05
N	1134	1160	2294[9]

Source: TSCS 4.1Q2 and 4.3Q1
† p<.10; * p<.05 (t-test for gender difference)

[9] Unweighted n=2156; 1054 men and 1102 women.

Table 4.3. Weighted Distribution of Sociodemographic Factors and Health Measures by Gender for People aged 45 to 64 in Taiwan, 2000-2002.

	Men	Women	Total
Age (mean)	53.17	53.00	53.08
Educational attainment (%)			
Junior high school or below	60.95	80.94 *	71.67
High school	19.82	10.79 *	14.98
Junior college or above	19.23	8.27 *	13.35
Employment status (%)			
Self-employed	37.20	10.66 *	22.97
Non-familial employment	32.49	22.27 *	27.01
Familial employment	4.08	10.95 *	7.76
Unemployed	9.47	3.16 *	6.09
Not in labor force	16.76	52.97 *	36.18
Monthly income (NTD)			
Personal income (mean)	31,000	12,000 *	21,000
Family income (mean)	62,000	55,000 *	58,000
Family role factors (%)			
Married	87.99	82.90 *	85.26
Father living together	6.16	1.85 *	3.85
Mother living together	15.83	2.97 *	8.93
Father in law living together	0.00	2.41 *	1.29
Mother in law living together	0.42	4.55 *	2.64
Married son living together	17.40	28.80 *	23.50
Unmarried son living together	56.20	52.30	54.10
Married daughter living together	4.50	5.80	5.20
Unmarried daughter living together	46.70	39.30 *	42.70
Health Behavior			
Alcohol drinking (%)	55.23	11.63 *	31.85
Smoking (%)	49.26	2.67 *	24.28
Health Status			
Self rated health (mean)	3.11	2.90 *	3.00
Chronic disease (%)	32.25	31.18	31.68
Illness in the past two week (%)	31.27	43.88 *	38.03
N	493	570	1063[10]

Source: TSCS 4.1Q2 and 4.3Q1
† p<.10; * p<.05 (t-test for gender difference)

[10] Unweighted n=1154; 559 men and 595 women.

Table 4.4. Weighted Distribution of Sociodemographic Factors and Health Measures by Gender for People aged 65 or over in Taiwan, 2000-2002.

	Men	Women	Total
Age (mean)	72.11	72.48	72.29
Educational attainment (%)			
Junior high school or below	82.14	97.18 *	89.64
High school	9.66	2.13 *	5.90
Junior college or above	8.20	0.70 *	4.46
Employment status (%)			
Self-employed	15.78	2.72 *	9.27
Non-familial employment	5.15	2.91	4.04
Familial employment	6.09	5.02	5.56
Unemployed	3.74	4.30	4.02
Not in labor force	69.23	85.05 *	77.12
Monthly income (NTD)			
Personal income (mean)	7,000	2,000 *	4,000
Family income (mean)	37,000	35,000	36,000
Family role factors (%)			
Married	74.11	44.83 *	59.51
Father living together	0.00	0.00	0.00
Mother living together	0.51	0.37	0.44
Father in law living together	0.00	0.82	0.41
Mother in law living together	0.74	0.72	0.73
Married son living together	40.30	51.70 *	46.00
Unmarried son living together	18.90	13.60 †	16.30
Married daughter living together	4.50	6.20	5.30
Unmarried daughter living together	8.20	5.80	7.00
Health Behavior			
Alcohol drinking (%)	24.54	3.33 *	13.96
Smoking (%)	40.27	4.15 *	22.26
Health Status			
Self rated health (mean)	2.90	2.61 *	2.76
Chronic disease (%)	54.44	57.71	56.07
Illness in the past two week (%)	53.26	81.68 *	67.43
N	243	242	485[11]

Source: TSCS 4.1Q2 and 4.3Q1
† p<.10; * p<.05 (t-test for gender difference)

[11] Unweighted n=538; 283 men and 255 women.

While the gender gap in personal income increases with age (the female/male personal income ratio of the three age groups are 0.76, 0.39, and 0.29, respectively), the extent of gender difference in family income is more stable (the female/male family income ratio as we move from youngest to oldest across the three age groups are 0.92, 0.89, and 0.95, respectively). As people age, more men than women stay married (the female/male married ratios from youngest to oldest across the three age groups are 1.32, 0.94, and 0.60). The patterns of living arrangements remain roughly the same across the three age groups. While more men than women have their own parents living in their households, women have a greater chance than men of living with their parents-in-law and children.

Across the three age groups, we find a lower proportion of alcohol drinking and smoking among females than among males. The prevalence of drinking and smoking decreases with age in general for both men and women, except that elderly women report a higher proportion who smoke (4.15%, see Table 4.4) than middle-aged women (2.67%, see Table 4.3). Both men and women report poorer health status as they age. Across the three age groups, men consistently report better self-rated health status and less recent illness than do women. The gender differences in these two health measures does not change significantly across the three age groups. Especially noteworthy is the finding that, while a higher proportion of women report chronic disease in the youngest age group (Table 4.2), the gender difference in chronic disease becomes insignificant among middle-aged and elderly people (Table 4.3 and 4.4).

The distributions of social and behavioral factors and health measures presented in Table 4.1 through Table 4.4 show that men are more likely than women to have higher educational attainment and remain in the labor market over different stages in adulthood. Non-familial employment is in general the major choice for working men and women,

especially for the young adults. However, with increasing age, men are more likely to be self-employed. Alternatively, middle-aged women are more likely than young women to work in family businesses. This pattern coincides with existing research on female employment in Taiwan society (Yi and Chen 2001). We also find that men consistently report fewer recent illness and better self-rated health than do women, but no significant gender differences in chronic disease are found. As the gender gap in self-rated health and illness in the past two weeks remains relatively constant across the three age groups, gender differences in the prevalence of chronic disease become insignificant after people are middle-aged.

2. CHRONIC DISEASE

A. Descriptive Analyses

Table 4.5 presents the weighted proportion of chronic disease by sociodemographic and behavioral factors for men and women. To begin with, compared to those with junior high school or less education, both men and women with high school or more education are less likely to report chronic disease. The pattern of associations between marital status and chronic disease are different for men and women. While married men are more likely to report chronic disease, married women are not significantly different from unmarried women. It is notable that age is not controlled in this descriptive table, so we cannot exclude the possibility that age could be playing a role here. Regarding the association between employment and chronic disease, people who are not currently employed are in general more likely than working people to report chronic disease. This could be due to the fact that chronically ill people are less likely to be able to work. People in the 2^{nd}, 3^{rd}, and 4^{th} quarters of income do show lower proportions reporting chronic disease than those in the 1^{st} (the lowest) income level.

Table 4.5. Weighted Proportion of Chronic Diseases by Gender for Taiwanese Adults

	Total	Men	Women
Educational attainment			
Junior high school or below	.32*	.30*	.33*
High school	.15*	.17*	.13*
Junior college or above	.15*	.16*	.15*
Marital Status			
Not-married	.20*	.14*	.25
Married	.25*	.26*	.23
Employment status			
Not currently employed	.33*	.36*	.31*
Self employed	.21*	.22*	.19*
Non-familial employment	.15*	.14*	.17*
Familial employment	.19*	.22*	.17*
Monthly family income			
Missing category	.31*	.26*	.34*
The 1st quarter income level	.29*	.30*	.28*
The 2nd quarter income level	.21*	.19*	.23*
The 3rd quarter income level	.19*	.19*	.19*
The 4th quarter income level	.17*	.16*	.18*
Living arrangement with unmarried children			
No unmarried children living in the household	.25*	.21	.29*
One or more unmarried children living in the household	.21*	.23	.20*
Living arrangement with married children			
No married children living in the household	.19*	.19*	.20*
One or more married children living in the household	.44*	.44*	.44*
Living arrangement with parents/in laws			
No parents/ in laws living in the household	.29*	.30*	.29*
One or more parents/ in laws living in the household	.12*	.12*	.12*
Alcohol drinking			
Non- or mild-drinkers	.23	.22	.23†
Heavy drinkers	.21	.19	.38†
Cigarettes smoking			
Non- or mild-smokers	.24*	.24*	.23†
Heavy smokers	.18*	.17*	.38†

Source: TSCS 4.1Q2 and 4.3 Q1
† p< .10; * p<.05 (One-way ANOVA)

However, differences among the three higher quarters are small. With respect to living arrangements, having unmarried children living in the household is associated with a smaller chance of reporting chronic disease for women, but not for men. For both men and women, living with married children is associated with a higher risk of reporting chronic disease. This could be because people with chronic disease are more likely to move in with married children to seek assistance in daily life. Living with parents or parents-in-law is linked to a smaller chance of chronic disease for both men and women. This suggests that parents may be able to provide social or financial support for their adult children. Surprisingly, the associations between two risky health behaviors and chronic disease exhibit opposite effects between men and women. For men, a lower proportion of chronic ailments is found among those who drink and smoke heavily than those not doing so. In contrast, higher proportions of chronic disease are displayed in women with heavy drinking and smoking behaviors.

Table 4.6 shows proportions of chronic disease for individuals with different sociodemographic and behavioral factors across the three age groups. Results suggest that the associations between these factors and chronic disease vary substantially by gender and age. The associations between education and chronic disease are quite different for young adults and the elderly. While having junior high school or less education is associated with a greater chance of chronic disease for young individuals, it is linked to a smaller chance of chronic disease for the elderly. Similarly, for young men, being currently married is associated with a greater chance of chronic disease, but for middle-aged women, there is a smaller chance of reporting chronic disease. The differences in chronic disease between the employed and not employed are hardly noticeable among young adults, but the protective effect of employment manifests among the middle-aged and the elderly. Surprisingly, family income level does not show a significant association

Table 4.6. Weighted Proportion of Chronic Diseases by Gender for Taiwanese Adults in Different Age Groups

	Aged 18 to 44			Aged 45 to 64			Aged 65 or over		
	Total	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**
Educational attainment									
Junior high school or below	**.15***	**.13[m]**	**.16†**	**.32**	**.31**	**.32**	**.54***	**.51†**	**.57**
High school	.10*	.08[m]	.11†	.34	.39	.25	.76*	.73†	.89
Junior college or above	.12*	.10[m]	.13†	.28	.28	.29	.68*	.65†	1.00
Marital status									
Not-married	.10*	.09†	.11	.36	.32	.38†	.54	.50	.56
Married	.13*	.12†	.14	.31	.32	.30†	.57	.56	.60
Employment status									
Not currently employed	.12	.11	.12	.37*	.40†	.35†	.58†	.58	.59
Self employed	.12	.10	.13	.30*	.32†	.23†	.39†	.38	.41
Non-familial employment	.12	.10	.14	.28*	.26†	.29†	.53†	.55	.50
Familial employment	.10	.11	.09	.23*	.24†	.23†	.57†	.58	.56
Monthly family income									
Missing category	.12	.10	.14	.33	.29	.34	.61	.82	.54
The 1st quarter income level	.13	.13	.13	.35	.36	.34	.58	.52	.63
The 2nd quarter income level	.13	.11	.14	.30	.31	.29	.48	.51	.44
The 3rd quarter income level	.11	.09	.13	.32	.34	.30	.57	.49	.68
The 4th quarter income level	.10	.09	.11	.29	.27	.31	.59	.63	.56
Living arrangement with unmarried children									
No unmarried children living in the household	.10*	.08*	.12	.35†	.35	.35	.55	.52	.58
One or more unmarried children living in the household	.13*	.13*	.13	.30†	.31	.29	.58	.61	.54
Living arrangement with married children									
No married children living in the household	.12	.10	.13	.30*	.31	.29	.59	.58	.59
One or more married children living in the household	.10	.26	.00	.36*	.38	.36	.54	.50	.56
Living arrangement with parents/in laws									
No parents/ in laws living in the household	.14*	.12	.16*	.32	.33	.31	.56	.55	.58
One or more parents/ in laws living in the household	.10*	.09	.10*	.30	.31	.29	.42	.49	.38
Alcohol drinking									
Non- or mild-drinkers	**.12**	**.11**	**.13***	**.31**	**.31**	**.31***	**.56**	**.55**	**.58**
Heavy drinkers	**.10**	**.07**	**.28***	**.40**	**.38**	**.80***	**.00**	**.00**	**.58**
Cigarettes smoking									
Non- or mild-smokers	.12	.11	.12*	.32	.34	.31	.57	.56	.58
Heavy smokers	.11	.09	.37*	.29	.29	.19	.50	.49	.65

Source: TSCS 4.1Q2 and 4.3 Q1

[m] 12 < p< .10; † p < .10; * p<.05 (One-way ANOVA)

with chronic disease. Regarding living arrangements, having unmarried children living in the household is associated with a greater chance of reporting chronic disease for young adults, but it is protective against chronic disease for the middle-aged. Living with married children relates to a significantly greater chance of chronic disease for the middle-aged. For the elderly, although the effect is not statistically significant, living with married children appears to be associated with a smaller chance of reporting chronic disease. Living with parents or in-laws is associated with a lower risk of having chronic disease for young adults, especially for young women. This suggests that parents/in-laws could offer social support such as baby-sitting and housework, and in turn reduce the chance of reporting chronic disease for young women. The hazardous effect of heavy drinking and heavy smoking is only manifested among women. The positive association of these two risky behaviors and chronic disease is especially evident among young women.

B. Multivariate Analyses

a. Overall Gender Differences in Chronic Disease

Table 4.7 presents the odds ratios for differences in chronic disease for the entire sample. In order to examine the gender differences in chronic disease and identify the covariates that are associated with the possible differences, gender is put in the baseline model, with an adjustment for age. Other explanatory and control variables are then included. Model 1 shows no significant gender difference in reporting chronic disease among Taiwanese adults.

Looking at the full model of main effects (Model 8), we see an increase of one year in age is associated with a 5.1% higher risk of reporting chronic disease, and the effect is statistically significant. Opposite to expectations, educational attainment shows

Table 4.7. Odds Ratio for Differences in Chronic Diseases, Taiwanese Adults, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Male	.911	.907	.907	.949	.947	.966	.964	.979	.975
Age	1.057***	1.057***	1.057***	1.054***	1.055***	1.052***	1.051***	1.051***	1.051***
Educational attainment									
High school		.955	.955	.955	.966	.970	.967	.968	.963
Junior college or above		1.070	1.071	1.060	1.104	1.109	1.096	1.089	1.076
Marital Status									
Married			1.009	1.047	1.047	1.008	1.038	1.033	1.046
Employment status									
Self employed				.779†	.789†	.781†	.786†	.784†	.599**
Non-familial employment				.841[m]	.850	.839[m]	.841	.845	.794
Familial employment				.684*	.693*	.696*	.697*	.703†	.604*
Monthly family income									
Missing category					1.044	1.058	1.056	1.058	1.052
The 2nd quarter income level					1.020	1.019	1.023	1.022	1.018
The 3rd quarter income level					1.042	1.042	1.047	1.043	1.041
The 4th quarter income level					.895	.904	.907	.905	.897
Living arrangement									
Number of parents living in the household						.903	.895	.896	.891[m]
Number of unmarried children living in the household							.971	.973	.900†
Health Behavior									
Non- or mild- drinkers								.813	.803
Non- or mild- smokers								1.145	1.150
Interaction effects									
Unmarried children living in the household x self-employment									1.235*
Unmarried children living in the household x non-familial employment									1.074
Unmarried children living in the household x familial employment									1.146
-2LL	3620.443	3619.666	3619.657	3612.467	3611.100	3609.096	3608.544	3606.697	3601.884

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

no significant effect on chronic disease. In addition, while the odds of the three types of employment relative to the non-employment are all less than 1.0, only self-employment and familial employment are significantly associated with a lower risk of reporting chronic disease by 21.6% and 29.7%, respectively. Finally, marital status, living arrangements, and risky health behaviors exhibit no significant effects on chronic disease.

The "number of children living in the household-by-self-employment" is found to be significant in the test of interaction (Model 9). Two odds ratios can be obtained by multiplying the exponential coefficients of the interaction term and the two main effect terms. The odds of reporting chronic disease for those who are self-employed and have unmarried children relative to those who are not employed and also have unmarried children is 0.599 * 1.235 = 0.740. This implies that, among people with unmarried children living in the household, self-employed individuals are 26% less likely than non-employed individuals to report chronic disease. In addition, the odds of reporting chronic disease for self-employed individuals with *n* unmarried children relative to self-employed individuals with *(n-1)* unmarried children is 0.90 * 1.235 = 1.112. Thus, among people who are self-employed, living with one additional child may increase by 11.2% the chance of reporting chronic disease. These results provide a mixed result regarding the effect of multiple roles on health. On the one hand, compared to non-employment, paid work is associated with better health outcomes. On the other hand, among working people, additional family responsibilities seem to lead to chronic ailments.

Table 4.8 presents the odds ratios for chronic disease among Taiwanese women. Women whose highest degree is high school are significantly less likely than women with either a lower or higher level of education to report chronic disease (see Model 2 through Model 7). In Model 8 (the full model of main effects), although obtaining a high school degree does not exhibit a significant effect on chronic disease, the odds ratio, 0.780, is

Table 4.8. Odds Ratio for Chronic Diseases, Taiwanese Women, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.053***	1.050***	1.050***	1.049***	1.050***	1.045***	1.041***	1.043**	1.041***
Educational attainment									
High school		.737†	.734†	.725†	.723†	.734†	.718†	.726	.725†
Junior college or above		.991	.966	.931	.951	.987	.912	.949	.945
Marital Status									
Married			.910	.941	.934	.877	.947	.968	.971
Employment status									
Self employed				.791	.798	.768	.780	.780	.483*
Non-familial employment				.991	.994	.976	.978	.983	.832
Familial employment				.634*	.641†	.643†	.649†	.659†	.550†
Monthly family income									
Missing category					1.011	1.029	1.028	1.040	1.031
The 2nd quarter income level					1.108	1.111	1.125	1.126	1.110
The 3rd quarter income level					1.057	1.060	1.079	1.061	1.048
The 4th quarter income level					.969	.980	.994	1.001	.980
Living arrangement									
Number of parents/in-laws living in the household						.818†	.791*	.790*	.782*
Number of unmarried children living in the household							.898†	.902†	.821*
Health Behavior									
Non- or mild- drinkers								.353*	.363*
Non- or mild- smokers								.396*	.389*
Interaction effects									
Unmarried children living in the household x self-employment									1.396†
Unmarried children living in the household x non-familial employment									1.145
Unmarried children living in the household x familial employment									1.164
-2LL	1926.576	1922.611	1922.048	1916.760	1916.068	1912.273	1908.554	1896.600	1892.203

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

still substantially lower than 1.0. The full model of main effects (Model 8) illustrates several significant risk factors for chronic disease among Taiwanese women. First, an increase of one year in age is significantly associated with about a 4.3% higher risk of reporting chronic disease. In addition, net of other effects, family employed women are 34.1% less likely than not employed women to report chronic disease. Since the odds ratio between non-familial employed and not employed women is 0.983 and not significant, we may argue that familial employed women are less likely than non-familial employed women to report chronic disease. Model 8 also shows that, as marital status shows no significant effect on chronic disease, living together with parents/in-laws or unmarried children is significantly associated with a smaller chance of reporting chronic disease for females. Women who have parents/in-laws living in the household are 21% less likely than those who do not to report chronic disease. Adding an unmarried child to the household would decrease women's chance of reporting chronic disease by 9.8%. In Model 9, the significant interaction term of "number of unmarried children living in the household-by-self-employment" allows interpretations for two odds ratios. First, among the women with unmarried children living in the household, those who are self-employed are 32.6% less likely than those who are non-employed to report chronic disease (odds ratio = 0.483 * 1.396 = 0.674). Second, for self-employed women, adding an unmarried child to the household may increase by 14.6% the chance of reporting chronic disease (odds ratio = 0.821 * 1.396 = 1.146).

Table 4.9 contains estimates of risk of chronic disease among Taiwanese men. Looking at the full model of main effects (Model 8), we find an increase of one year in age is significantly associated with about a 5.7% higher risk of reporting chronic disease. Education shows no significant effects on chronic disease, but the odds of reporting chronic disease for the two higher levels of education relative to the lowest level of

Table 4.9. Odds Ratio for Chronic Diseases, Taiwanese Men, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.061***	1.063***	1.062***	1.056***	1.056***	1.056***	1.057***	1.057***	1.059***
Educational attainment									
High school		1.202	1.201	1.212	1.227	1.227	1.231	1.219	1.257
Junior college or above		1.134	1.132	1.137	1.187	1.187	1.199	1.146	1.157
Marital Status									
Married			1.092	1.214	1.217	1.214	1.147	1.131	1.157
Employment status									
Self employed				.698*	.717†	.717†	.710†	.718†	.857
Non-familial employment				.668*	.684*	.683*	.679*	.685*	.678†
Familial employment				.797	.817	.817	.816	.840	.858
Monthly family income									
Missing category					1.189	1.191	1.203	1.236	1.238
The 2nd quarter income level					.953	.953	.948	.945	.953
The 3rd quarter income level					1.066	1.066	1.060	1.047	1.040
The 4th quarter income level					.873	.874	.870	.864	.872
Living arrangement									
Number of parents/in-laws living in the household						.994	1.003	1.002	1.163
Number of unmarried children living in the household							1.046	1.053	1.068
Health Behavior									
Non- or mild- drinkers								.954	.949
Non- or mild- smokers								1.260[m]	1.234
Interaction effects									
Parents/in-laws living in the household x self employment									.611†
Parents/in-laws living in the household x non-familial employment									.973
Parents/in-laws living in the household x familial employment									.916
-2LL	1692.207	1690.834	1690.461	1684.252	1682.865	1682.861	1682.253	1679.707	1674.603

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

education are both greater than 1.0. In addition, self-employed and non-familial employed men are less likely than those who are not employed to report chronic disease by 28.2% and 31.5%, respectively. Although the odds ratio of family employment to non-employment is .840, this estimate is not statistically significant. In Model 9, the significant interaction term of "number of parents/in-laws living in the household-by-self-employment" suggests that, for men having parents or in-laws living in the household, the self-employed are about 47.6% less likely than the non-employed to report chronic disease (odds ratio = 0.857 * 0.611 = 0.524). Among self-employed men, having an additional parent/in-law living in the household is associated with about a 29% smaller chance of reporting chronic disease (odds ratio = 1.163 * 0.611 = 0.711).

Comparing Table 4.8 and 4.9, we find the determinants of chronic disease are quite different for men than for women. Results imply that the beneficial effects of family support on health appear to be more significant among women than among men. For women, significant factors that yield protective effects against chronic disease include familial employment, parents/in-laws living in the household, unmarried children in the household, non-heavy drinking, and non-heavy smoking (Model 8 in Table 4.8). For men, significant factors related to a lower risk of chronic disease are self-employment and non-familial employment (Model 8 in Table 4.9). The only significant factor related to a higher risk of chronic disease for both men and women is the increase in age. The result of a *t*-test ($t = -1.53$) suggests that, at a level of 0.05, aging effects on men and women are not significantly different. Regarding the health effects of multiple roles, women seem to be more likely than men to experience a detrimental effect from role overload (see the interaction effect in Table 4.8).

b. Gender Differences in Chronic Disease among the Young Adults

Table 4.10 presents the odds ratios for differences in chronic disease for the Taiwanese population aged 18 to 44. Model 1 shows that, with age adjusted, young men are about 20% less likely than young women to report chronic disease. After including the main effects of all the covariates in Model 8, gender differences in chronic disease become insignificant (although the odds ratio of men to women is still 0.801). Looking at the full model of main effects (Model 8), we find that an increase of one year in age is associated with a 3.3% higher risk of reporting chronic disease. Compared to those without a high school degree, high school education (but not higher educational attainment) is significantly associated with about a 30% lower risk of chronic disease. The effects of all three types of employment on chronic disease are not statistically significant. However, while the odds of reporting chronic disease for familial employment and self-employment relative to non-employment are both less than 1.0, the odds ratio is again greater than 1.0 for non-familial employment. This implies that the two former types of employment may provide more health benefits than the latter or that the former represents a more demanding situation. Marital status and living arrangements do not show significant effects on chronic disease among young adults.

Model 9 through Model 11 in Table 4.10 show five interaction terms that exhibit significant moderating effects on chronic disease among young adults: "married-by-non-familial employment" (Model 9), "number of parents/in-laws living in the household-by-self-employment" (Model 10), "number of parents/in-laws living in the household-by-non-familial employment" (Model 10), "number of unmarried children living in the household-by-non-familial employment" (Model 11), and "number of unmarried children living in the household-by-familial employment" (Model 11). Five pairs of interpretations for odds ratios can be derived from the five interaction terms: (1) Among married young

Table 4.10. Odds Ratio for Differences in Chronic Diseases among Taiwanese Adults Aged 18-44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Male	.804†	.797†	.796†	.793†	.790†	.806	.798[m]	.801	.758†	.776[m]	.763†
Age	1.038***	1.035***	1.035**	1.036**	1.035**	1.030*	1.033**	1.033**	1.034**	1.036**	1.034**
Educational attainment											
High school		.694*	.694*	.685*	.703*	.708*	.695*	.691*	.694*	.702*	.694*
Junior college or above		.912	.912	.888	.954	.954	.927	.922	.892	.904	.892
Marital Status											
Married			.994	1.003	1.010	.966	1.047	1.049	.629	1.069	1.077
Employment status											
Self employed				.945	.982	.971	.977	.981	.876	1.455	.809
Non-familial employment				1.056	1.092	1.075	1.072	1.072	.719	1.460	.708
Familial employment				.777	.803	.815	.819	.818	.542	1.175	.422[m]
Monthly Family income											
Missing category					1.113	1.154	1.140	1.141	1.143	1.130	1.149
The 2nd quarter income level					1.064	1.068	1.065	1.066	1.064	1.063	1.060
The 3rd quarter income level					.912	.918	.915	.917	.905	.909	.919
The 4th quarter income level					.838	.857	.848	.849	.853	.864	.866
Living arrangement											
Number of parents/in-laws living in the household						.903	.903	.903	.897	1.199	.893
Number of unmarried children living in the household							.938	.937	.942	.939	.719*
Health Behavior											
Non- or mild- drinkers								1.120	1.110	1.126	1.127
Non- or mild- smokers								.978	.967	.944	.967
Interaction effects											
Married x self employment									1.336		
Married x non-familial employment									2.032*		
Married x familial employment									1.943		
Parents/in-laws living in the household x self employment										.599†	
Parents/in-laws living in the household x non-familial employment										.725†	
Parents/in-laws living in the household x familial employment										.670	
Unmarried children living in the household x self-employment											1.214
Unmarried children living in the household x non-familial employment											1.416*
Unmarried children living in the household x familial employment											1.562†
-2LL	1629.538	1623.894	1623.892	1622.530	1620.694	1619.408	1818.783	1618.627	1613.861	1613.767	1610.978

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

adults, the non-familial employed are about 46.1% more likely than the non-employed to report chronic disease (odds ratio = 0.719 * 2.032 = 1.461). For the non-familial employed young adults, being married is associated with a 27.8% higher risk of reporting chronic disease (odds ratio = 0.629 * 2.032 = 1.278). (2) Among young adults living with parents or in-laws, the self-employed are about 12.8% less likely than the non-employed to report chronic disease (odds ratio = 1.455* 0.599 = 0.872). For the self-employed young adults, having an additional parent or in-law living in the household decreases the odds of reporting chronic disease by 28.2% (odds ratio = 1.199 * 0.599 = 0.718). (3) Among young adults living with parents/in-laws, the non-familial employed are about 5.9% more likely than the non-employed to report chronic disease (odds ratio = 1.460 * 0.725 = 1.059). For non-familial employed young adults, having an additional parent or in-law living in the household is associated with a 13.1% smaller chance of reporting chronic disease (odds ratio = 1.199 * 0.725 = 0.869). (4) Among the young adults with unmarried children living in the household, the non-familial employed are about 0.3% more likely than the non-employed to report chronic disease (odds ratio = 0.708 * 1.416 = 1.003). For non-familial employed young adults, adding an unmarried child to the household is associated with a 1.8% greater chance of reporting chronic disease (odds ratio = 0.719 * 1.416 = 1.018). (5) Among young adults who have unmarried children living in the household, the familial employed are 34.1% less likely than the non-employed to report chronic disease (odds ratio = 0.422 * 1.562 = 0.659). For the familial employed young adults, having an additional unmarried child in the household is associated with a 12.3% greater chance of reporting chronic disease (odds ratio = 0.719 * 1.562 = 1.123). these significant interactions suggest that, for young adults, detrimental effects of multiple roles on health are more likely to occur among the non-familial employed. That is, those who are non-family employed and bearing certain family roles

(such as being married, living with parents/in-laws, or living with unmarried children) face a higher risk of chronic disease than their non-employed counterparts. One possible explanation is that working in non-familial businesses is more demanding, so that persons in this category experience greater stress from role strain, and the stress in turn leads to a higher risk of morbidity.

Table 4.11 presents odds ratios of chronic disease among Taiwanese women aged 18 to 44. Looking at the full model of main effects (Model 8), the odds ratios regarding education imply that higher educational attainment is associated with a smaller chance of reporting chronic disease. However, only the effect of high school (odds ratio = 0.632) is significant. The effect of having a higher degree is also less than one (odds ratio = 0.882), but the odds ratio is not significant. Odds ratios regarding the three types of employment to non-employment are all insignificant, but the odds of reporting chronic disease for family employed women relative to their non-employed counterparts (0.807) is substantially smaller than those for the other two types of employment (1.320 and 1.286 for self-employment and non-familial employment, respectively). This implies that familial employment may yield more health benefits for young women. In addition, net of other effects, having an additional parent/in-law living in the household is significantly associated with about a 28% smaller chance of reporting chronic disease. This suggests that social support offered by parents/in-laws living in the household could enhance young womens' health. Marital status and living with unmarried children does not show significant effects on chronic disease for young women. Lastly, among young women, non-heavy smokers are 74% less likely than heavy smokers to report chronic disease.

Model 9 in Table 4.11 presents the two significant interaction terms: "number of unmarried children living in the household-by-non-familial employment" and "number of unmarried children living in the household-by-familial employment." The first significant

Table 4.11. Odds Ratio for Chronic Diseases among Taiwanese Women Aged 18-44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.015	1.010	1.006	1.005	1.006	.991	.992	.997	.997
Educational attainment									
High school		.638*	.640*	.610*	.604*	.612*	.605*	.632†	.637†
Junior college or above		.801	.825	.772	.806	.820	.799	.882	.868
Marital Status									
Married			1.139	1.177	1.177	1.012	1.053	1.116	1.158
Employment status									
Self employed				1.341	1.404	1.316	1.310	1.320	1.586
Non-familial employment				1.260	1.291	1.244	1.240	1.286	.804
Familial employment				.707	.732	.776	.777	.807	.206†
Monthly family income									
Missing category					1.305	1.436	1.431	1.373	1.401
The 2nd quarter income level					1.248	1.281	1.275	1.250	1.235
The 3rd quarter income level					1.027	1.054	1.052	.970	.961
The 4th quarter income level					.900	.964	.959	.916	.922
Living arrangement									
Number of parents/in-laws living in the household						.718*	.718*	.721*	.717*
Number of unmarried children living in the household							.965	.954	.765m
Health Behavior									
Non- or mild- drinkers								.514	.492
Non- or mild- smokers								.260**	.249**
Interaction effects									
Unmarried children living in the household x self-employment									.897
Unmarried children living in the household x non-familial employment									1.379†
Unmarried children living in the household x familial employment									1.970†
-2LL	887.571	883.291	882.937	879.369	877.429	870.489	870.378	859.787	852.442

† p<.10; * p<.05; ** p<.01; *** p<.001

m. The p-value of this coefficient is between 0.10 and 0.12.

interaction suggests that, among young women having unmarried children in the household, and who are non-familial employed are about 10.9% more likely than those who are not employed to report chronic disease (odds ratio = 0.804 * 1.379 = 1.109). Also, for non-familial employed young women, adding a child to the household may increase by about 5.5% the chance of reporting chronic disease (odds ratio = 0.765 * 1.379 = 1.055). The second significant interaction implies that, among young women having unmarried children in the household, those who are familial employed are 59.4% less likely than those who are not employed to report chronic disease (odds ratio = 0.206 * 1.970 = 0.406). For young familial employed women, adding a child to the household may increase by 50.7% the chance of reporting chronic disease (odds ratio = 0.765 * 1.970 = 1.507). Compared to non-familial employment, familial employment is likely to produce more health benefits for young women with unmarried children in the household. On the other hand, evidence also indicatets that multiple roles are associated with a higher risk of chronic disease for employed young women.

Table 4.12 presents odds ratios for chronic disease among Taiwanese men aged 18 to 44. The full model of main effects (Model 8) shows that an increase of one year in age is associated with a 9.3% greater chance of reporting chronic disease for young men. The odds of reporting chronic disease for the two higher levels of education relative to the reference group are both less than 1.0, but these effects are not significant. Also, the odds for the three types of employment relative to non-employment are all less than 1.0 but insignificant. Before family income is controlled in Model 5, self-employment is significantly associated with about a 48% smaller chance of reporting chronic disease relative to non-employment (Model 4). This provides evidence that, for young men, part of the beneficial effects of self-employment on health is mediated through higher income. One noteworthy finding is that, although the effects of being married are insignificant for

Table 4.12. Odds Ratio for Chronic Diseases among Taiwanese Men Aged 18-44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	1.067***	1.065***	1.080***	1.085***	1.084***	1.089***	1.092***	1.093***
Educational attainment								
High school		.755	.773	.806	.829	.825	.816	.764
Junior college or above		.974	.995	.987	1.041	1.054	1.042	.896
Marital Status								
Married			.717	.787	.788	.828	.905	.911
Employment status								
Self employed				.519†	.541[m]	.553	.566	.585
Non-familial employment				.676	.702	.726	.730	.734
Familial employment				.815	.826	.822	.830	.840
Monthly family income								
Missing category					.897	.851	.841	.887
The 2nd quarter income level					.948	.946	.949	.949
The 3rd quarter income level					.853	.845	.845	.838
The 4th quarter income level					.872	.846	.838	.850
Living arrangement								
Number of parents/in-laws living in the household						1.125	1.125	1.128
Number of unmarried children living in the household							.938	.926
Health Behavior								
Non- or mild- drinkers								1.551
Non- or mild- smokers								1.284
-2LL	734.866	733.217	731.416	728.030	727.721	726.933	726.680	723.070

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

both young women (in Table 4.11) and young men, the effects are in opposite directions. That is, while marriage is associated with a smaller chance of reporting chronic disease for young men (see Model 8 in Table 4.12), it is related to a slightly higher risk of chronic disease for young women (see Model 8 in Table 4.11). Living with unmarried children has no significant effect on reporting chronic disease for young men. Also, no significant interaction term is found.

Table 4.11 and Table 4.12 show that the risk factors for chronic disease are very different for young men than for young women. For young women, the significant protective factors against chronic disease are high school education, living with parents/in-laws, and non-heavy smoking (Model 8 in Table 4.11). There is no such factor producing significant protective effects against chronic disease for young men. Also, increase in age is significantly associated with a higher risk on chronic disease only for young men (Model 8 in Table 4.12). In addition, significant interactions in Table 4.11 suggest that, compared to non-familial employment, familial employment could yield more health benefits for young women.

c. Gender Differences in Chronic Disease among the Middle Aged

Table 4.13 shows the odds ratios for chronic disease among Taiwanese individuals aged 45 to 64. Unlike in the group of young adults, there is no significant gender difference in self-reported chronic disease among middle-aged people. Looking at the full model of main effects (Model 8), we see an increase of one year in age is associated with a 6.2% higher risk of reporting chronic disease. The odds of chronic disease for two higher educational levels relative to the reference group are both greater than 1.0, but only the one regarding high school education is statistically significant. Those with a high school degree appear to be 41.6% more likely than those with less education to report chronic disease. It is puzzling why only having a high school degree

Table 4.13. Odds Ratio for Chronic Diseases among Taiwanese Adults Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Male	1.042	1.009	1.018	1.048	1.036	1.041	1.035	1.045	1.052	1.060
Age	1.058***	1.063***	1.062***	1.058***	1.059***	1.058***	1.060***	1.062***	1.063***	1.061***
Educational attainment										
High school		1.372[m]	1.370[m]	1.377[m]	1.395[m]	1.394[m]	1.410†	1.416†	1.379[m]	1.394[m]
Junior college or above		1.033	1.037	1.070	1.112	1.109	1.128	1.147	1.149	1.167
Marital Status										
Married			.855	.891	.898	.896	.885	.875	.885	.865
Employment status										
Self employed				.840	.846	.849	.852	.849	.559*	.852
Non-familial employment				.786	.794	.795	.801	.813	.945	.678†
Familial employment				.566*	.569*	.569*	.571*	.588†	.507†	.635
Monthly family income										
Missing category					.789	.787	.774	.767	.773	.796
The 2nd quarter income level					.901	.902	.886	.889	.874	.924
The 3rd quarter income level					.999	.998	.977	.973	.967	1.010
The 4th quarter income level					.875	.876	.857	.842	.821	.862
Living arrangement										
Number of parents/in-laws living in the household						.945	.946	.945	.937	.949
Number of unmarried children living in the household							1.034	1.040	.987	1.040
Number of married children living in the household							1.035	1.031	1.028	.957
Health Behavior										
Non- or mild- drinkers								.617†	.580†	.604†
Non- or mild- smokers								1.309	1.333	1.319
Interaction effects										
Unmarried children living in the household x self-employment									1.325*	
Unmarried children living in the household x non-familial employment									.923	
Unmarried children living in the household x familial employment									1.126	
Married children living in the household x self-employment										.922
Married children living in the household x non-familial employment										2.182*
Married children living in the household x familial employment										.796
-2LL	1301.862	1299.268	1298.563	1293.445	1292.410	1292.289	1291.991	1287.848	1281.740	1281.301

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

is associated with a higher risk of adverse health outcomes. Existing data in this study are unable to provide a plausible explanation of this paradox. Further research is needed to determine whether this unexpected association between education and health really exists. The odds of reporting chronic disease for the three types of employment relative to non-employment in Model 8 are all less than 1.0, but only the one regarding familial employment is statistically significant. Familial employed middle-aged individuals appear to be 41.2% less likely than their non-employed counterparts to report chronic disease. Marital status and living arrangements are not found to be significantly associated with the chance of reporting chronic disease. Lastly, among middle-aged people, non-heavy drinkers are about 40% less likely than heavy drinkers to report chronic disease.

Two significant interaction terms are shown in Model 9 and Model 10 in Table 4.13. The interaction term "number of unmarried children living in the household-by-self-employment" (Model 9) suggests that, among middle-aged individuals with unmarried children in the household, those who are self-employed are 25.9% less likely than those who are not employed to report chronic disease (odds ratio = 0.559 * 1.325 = 0.741). For middle-aged self-employed individuals, having an additional child in the household is associated with about a 30.8% greater chance of reporting chronic disease (odds ratio = 0.987 * 1.325 = 1.308). The interaction term "number of married children living in the household-by-non-familial employment" (Model 10) implies that, among the middle-aged individuals having married children in the household, those who are non-familial employed are 47.9% more likely than those who are not employed to report chronic disease (odds ratio = 0.678 * 2.182 = 1.479). For the middle-aged non-familial employed individuals, having an additional married child living in the household may increase by about 108.8% the chance of reporting chronic disease (odds ratio = 0.957 * 2.182 =

2.088). These results suggest that non-familial employment is more likely than the other two types of employment to be associated with chronic ailments for middle-aged people.

Odds ratios in chronic disease among Taiwanese women aged 45 to 64 appear in Table 4.14. Looking at the full model of main effects (Model 8), we find an increase of one year in age is associated with a 6.8% greater chance of reporting chronic disease. The odds of reporting chronic disease for the two higher levels of education relative to the lowest level of education are both less than 1.0, but none of them is significant. Also, the odds for the three types of employment relative to non-employment are all less than 1.0 but insignificant. The protective effect of familial employment on chronic diseases is significant in Model 7. Also, the effect is marginal (p-value is between 0.10 and 0.12) in Model 4 through Model 6 and Model 8. Because there are only 14 familial employed women in this age group, the insignificant result is likely due to the small cell size. Thus, familial employment may well be associated with a smaller chance of reporting chronic disease for middle-aged women. Lastly, marital status and living arrangements are not found to have significant effects on chronic disease for middle-aged women.

Model 9 and Model 10 in Table 4.14 present the two significant interaction effects in this group. The first significant interaction "number of parents/in-laws living in the household-by-self-employment" (Model 9) suggests that, among middle-aged women with parents/in-laws living in the household, those who are self-employed are 399.4% more likely than those who are not employed to report chronic diseases (odds ratio = 0.558 * 9.283 = 4.994). For self-employed middle-aged women, having an additional parent/in-law living in the household may increase by 813.4% the chance of reporting chronic disease (odds ratio = 0.984 * 9.283 = 9.134). These two very large odds ratios likely result from a small sample size (Only 4 middle-aged self-employed women have parents/in-laws living in the household). The second significant interaction "number of

Table 4.14. Odds Ratio for Chronic Diseases among Taiwanese Women Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Age	1.068***	1.068***	1.065***	1.065***	1.065***	1.065**	1.068**	1.068**	1.071**	1.070**
Educational attainment										
High school		.887	.887	.870	.847	.847	.802	.816	.788	.842
Junior college or above		1.076	1.081	1.052	.988	.988	.913	.922	.883	.982
Marital Status										
Married			.746	.786	.784	.782	.777	.775	.779	.798
Employment status										
Self employed				.634	.637	.638	.633	.647	.538†	.229*
Non-familial employment				.981	.975	.975	.952	.976	1.065	1.279
Familial employment				.593[m]	.588[m]	.588[m]	.574†	.586[m]	.553†	.696
Monthly family income										
Missing category					.887	.888	.938	.942	.948	.944
The 2nd quarter income level					.922	.922	.961	.936	.929	.879
The 3rd quarter income level					.997	.997	1.039	1.016	1.020	.975
The 4th quarter income level					1.084	1.084	1.181	1.172	1.123	1.086
Living arrangement										
Number of parents/in-laws living in the household						1.021	1.019	1.026	.984	1.040
Number of unmarried children living in the household							.968	.983	.979	.962
Number of married children living in the household							.847	.857	.853	.856
Health Behavior										
Non- or mild- drinkers								.145	.148	.147
Non- or mild- smokers								1.182	1.206	1.278
Interaction effects										
Parents/in-laws living in the household x self employment									9.283†	
Parents/in-laws living in the household x non-familial employment									.671	
Parents/in-laws living in the household x familial employment									1.740	
Unmarried children living in the household x self-employment										1.886*
Unmarried children living in the household x non-familial employment										.825
Unmarried children living in the household x familial employment										.854
-2LL	689.101	688.893	687.380	683.146	682.771	682.764	681.776	679.078	673.743	669.506

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

unmarried children in the household-by-self-employment" (Model 10) suggests that, among middle-aged women having unmarried children living in the household, those who are self-employed are 56.6% less likely to report chronic disease (odds ratio = 0.229 * 1.886 = 0.434). For middle-aged self-employed women, adding a child to the household may increase by 81.4% the chance of reporting chronic disease (odds ratio = 0.962 * 1.886 = 1.814). These results indicate that the combination of self-employment and family roles, such as living with parents/in-laws and unmarried children, is likely to produce role overload (and extra stress) for middle-aged women which leads to a higher risk of chronic disease.

Table 4.15 presents the odds ratios of chronic disease among Taiwanese men aged 45 to 64. The full model of main effects (Model 8) shows that an increase of one year in age is associated with a 5.7% higher risk of reporting chronic disease. While the odds of reporting chronic disease for the two higher levels of educational attainment relative to the lowest level of education are both greater than 1.0, only one of them is statistically significant. Compared to those in the reference category, high school graduates are 103.3% more likely to report chronic disease. The odds for the three types of employment relative to non-employment all are less than 1.0, but these effects are not significant. Lastly, marital status and living arrangements have no significant effect on chronic disease for middle-aged men. The significant interaction "number of married children living in the household-by-non-familial employment" is shown in Model 9. This result indicates that, among middle-aged men having married children living in the household, those who are non-familial employed are 67.5% more likely than those who are not employed to report chronic disease (odds ratio = 0.576 * 2.908 = 1.675). For middle-aged non-familial employed men, having an additional married child living in the household may increase by 190.5% the chance of reporting chronic disease (odds ratio = 0.999 *

Table 4.15. Odds Ratio for Chronic Diseases among Taiwanese Men Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.047**	1.058**	1.059**	1.051**	1.054**	1.053**	1.053*	1.057*	1.055*
Educational attainment									
High school		1.811*	1.813*	1.806*	1.893*	1.890*	2.016*	2.033*	1.970*
Junior college or above		1.053	1.050	1.154	1.262	1.258	1.385	1.412	1.404
Marital Status									
Married			1.084	1.130	1.162	1.143	1.028	1.002	1.015
Employment status									
Self employed				.858	.885	.896	.918	.922	.850
Non-familial employment				.642[m]	.677	.681	.712	.725	.576†
Familial employment				.557	.572	.575	.552	.601	.612
Monthly family income									
Missing category					.554	.556	.523	.512	.568
The 2nd quarter income level					.885	.885	.815	.824	.871
The 3rd quarter income level					1.007	1.002	.896	.890	.940
The 4th quarter income level					.729	.730	.653	.636	.661
Living arrangement									
Number of parents/in-laws living in the household						.922	.914	.909	.905
Number of unmarried children living in the household							1.096	1.103	1.102
Number of married children living in the household							1.313	1.299	.999
Health Behavior									
Non- or mild- drinkers								.698	.672
Non- or mild- smokers								1.308	1.321
Interaction effects									
Married children living in the household x self-employment									1.216
Married children living in the household x non-familial employment									2.908†
Married children living in the household x familial employment									1.039
-2LL	611.979	606.506	606.434	603.146	601.048	600.897	598.739	596.078	592.300

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

2.908 = 2.905). These results suggest that a combination of non-familial employment and family roles such as raising children is likely to cause role strain and leads to a higher risk of chronic diseases.

Examining Table 4.14 and 4.15, we find no social factor that has a significant protective effect on chronic diseases for both middle-aged men and middle-aged women. For middle-aged women, aging is the factor related to a higher risk of chronic diseases. For middle-aged men, aging and high school education are associated with a higher risk of chronic diseases. The result of a *t*-test ($t = 0.38$) suggests that, at the level of 0.05, the aging effects for men and women are not significantly different. The analyses of interaction effects imply that, for middle-aged women, the combination of self-employment and family roles may have detrimental health impacts. For middle-aged men, the adverse health impacts of multiple roles are more likely among the non-familial employed individuals. These results provide evidence in support of the role strain hypothesis.

d. Gender Differences in Chronic Diseases among the Elderly

Table 4.16 presents odds ratios of chronic disease among Taiwanese people aged 65 or above. With age, educational attainment, and marital status controlled in Model 3, elderly men are about 30% less likely than elderly women to report chronic diseases, but this is the only significant effect of gender in this age group–although all estimates indicate a male advantage. For example, the gender difference in chronic disease becomes insignificant after employment status is controlled in Model 4, which implies that employment yields protective effect for elderly men. Another plausible explanation is that healthier men are more likely to remain in the labor market after age 65. The full model of main effects (Model 8) shows that, compared to those with a lower level of education, elders who have highest educational attainment (junior high school or above)

Table 4.16. Odds Ratio for Chronic Diseases among Taiwanese Adults Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Male	.872	.719[m]	.694†	.771	.806	.799	.775	.829	.813
Age	.989	.992	.995	.991	.992	.993	.993	.991	.989
Educational attainment									
Elementary school		1.214	1.199	1.230	1.225	1.221	1.203	1.194	1.240
Junior high school or above		2.228**	2.205**	2.111*	2.088*	2.083*	1.975*	1.963*	1.961*
Marital Status									
Married			1.146	1.147	1.172	1.166	1.185	1.186	1.089
Employment status									
Self employed				.481*	.484*	.497*	.517†	.523†	.129*
Non-familial employment				.748	.839	.834	.803	.794	.506
Familial employment				1.028	1.055	1.057	1.095	1.065	2.751
Monthly family income									
Missing category					.978	.960	1.148	1.171	1.141
The 2nd quarter income level					.649[m]	.637†	.681	.684	.664[m]
The 3rd quarter income level					.880	.865	1.015	1.038	1.019
The 4th quarter income level					.882	.857	1.071	1.105	1.065
Living arrangement									
Number of unmarried children living in the household						1.101	1.043	1.038	1.063
Number of married children living in the household							.784	.772[m]	.768[m]
Health Behavior									
Nondrinkers								1.324	1.341
Non- or mild- smokers								1.054	1.078
Interaction effects									
Married x self employment									6.085†
Married x non-familial employment									1.899
Married x familial employment									.291
-2LL	664.192	656.188	655.755	650.677	647.687	647.389	645.173	644.175	637.377

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

exhibit the greatest propensity to report chronic disease. One possible explanation for this phenomenon is mortality selection. That is, those with less education are more likely to be selected out from the population by mortality over the life course. Thus, a higher proportion of highly educated individuals survives the aging process which results in a greater chance of reporting chronic disease. Model 8 also shows that the odds of reporting chronic disease for self-employed individuals relative to non-employed individuals is 0.523 and significant. This indicates that self-employed elders are 47.7% less likely than the non-employed elders to report chronic ailments. Lastly, at a marginal level of significance ($0.10 < p < 0.12$), living with married children is associated with a smaller chance of reporting chronic disease among the elderly.

Model 9 in Table 4.16 presents one significant interaction term "married-by-self-employment." The interpretation is that, among married elders, the self-employed are 21.5% less likely than the non-employed to report chronic disease (odds ratio = 0.129 * 6.085 = 0.785). On the other hand, for self-employed elders, being married is associated with a much higher risk of chronic ailments (odds ratio = 1.089 * 6.085 = 6.627). It is difficult to explain why marriage is associated with detrimental health effects among self-employed elders. More investigation is needed to verify this association.

Table 4.17 presents the odds ratios for chronic disease among Taiwanese women at age 65 or above. Probably due to the small sample size of this group (n = 242), hardly any regression coefficients reach a significance level of 0.10. The full model of main effects (Model 8) shows that the odds of the two higher levels of education compared to the reference group are both greater than 1.0, but these effects are not significant. Also, the three types of employment do not display significant effects on chronic disease. For elderly women, the only variable that shows a significant effect is the second level of

Table 4.17. Odds Ratio for Chronic Diseases among Taiwanese Women Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	.983	.987	.989	.984	.985	.985	.984	.987
Educational attainment								
Elementary school		1.150	1.142	1.161	1.181	1.179	1.170	1.179
Junior high school or above		1.660	1.656	1.612	1.709	1.707	1.666	1.656
Marital Status								
Married			1.075	1.038	1.133	1.133	1.139	1.160
Employment status								
Self employed				.458	.349	.350	.358	.376
Non-familial employment				.647	.876	.875	.829	.925
Familial employment				.836	.787	.785	.787	.838
Monthly family income								
Missing category					.650	.649	.722	.730
The 2nd quarter income level					.415*	.414*	.438*	.404*
The 3rd quarter income level					1.219	1.217	1.366	1.385
The 4th quarter income level					.612	.611	.702	.684
Living arrangement								
Number of unmarried children living in the household						1.016	.971	.954
Number of married children living in the household							.866	.854
Health Behavior								
Nondrinkers								.212
Non- or mild- smokers								.512
-2LL	328.916	327.953	327.884	326.648	318.675	318.672	318.304	314.614

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

family income. Marital status and living arrangements display no significant effects on chronic ailments for elderly women.

Table 4.18 presents odds ratios for chronic disease among Taiwanese men aged 65 or over. The full model of main effects (Model 8) shows that the odds of reporting chronic disease for individuals with the highest level of education relative to individuals with the lowest level of education is 1.938 (at the marginal level of significance). The possible explanation for this paradox is likely to be mortality selection, as mentioned above. While the three types of employment do not display significant effects on chronic diseases in Model 8, self-employment shows some measured significant protective effects on chronic diseases in Model 4 through Model 6. The insignificance of self-employment in Model 7 and Model 8 is probably due to the small cell size caused by further control of other covariates. Thus, self-employment is likely to be associated with a lower risk of reporting chronic disease for elderly men. Model 8 also shows that, for elderly men, living with married children has a significant protective effect against chronic disease. Living with additional married children is associated with about a 40% lower risk of reporting chronic disease. Lastly, the odds of reporting chronic disease for non-drinkers relative to drinkers is 1.802. This is consistent with existing evidence that moderate drinking is associated with reduced risk of coronary artery disease (Ashley et al. 1994; Zakhari and Gordis 1999).

C. Summary

As shown in both descriptive analyses (Table 4.1) and regression analyses (Table 4.7), no significant overall gender difference in the prevalence of chronic disease is found among Taiwanese adults. These results are against my expectation because existing studies suggest that women's longer life span provides a greater chance to contract and report diseases (Crimmins, Kim, and Hagedorn 2002; Crimmins, Hayward, and Saito

Table 4.18. Odds Ratio for Chronic Diseases among Taiwanese Men Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	.996	.997	1.001	.999	1.002	1.005	1.008	1.001
Educational attainment								
Elementary school		1.326	1.300	1.374	1.261	1.273	1.245	1.194
Junior high school or above		2.534*	2.489*	2.440*	2.238*	2.258*	2.018†	1.938[m]
Marital Status								
Married			1.232	1.276	1.345	1.320	1.377	1.409
Employment status								
Self employed				.489†	.494†	.523†	.574	.591
Non-familial employment				.786	.813	.811	.803	.791
Familial employment				1.263	1.339	1.384	1.591	1.488
Monthly family income								
Missing category					3.336	3.253	4.923†	5.529*
The 2nd quarter income level					.922	.881	.949	.954
The 3rd quarter income level					.729	.698	.873	.939
The 4th quarter income level					1.275	1.185	1.739	1.942
Living arrangement								
Number of unmarried children living in the household						1.178	1.101	1.080
Number of married children living in the household							.632†	.594*
Health Behavior								
Nondrinkers								1.802†
Non- or mild- smokers								1.129
-2LL	335.115	327.768	327.320	323.074	317.634	317.131	313.521	310.064

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

1996). One possible explanation of the unexpected results is that the measure employed in this study only assesses the dichotomous response of "has" or "does not have" a chronic disease. While men and women may both report they have chronic diseases, the type and number of chronic ailments they develop can be very different (Verbrugge 1985). Although no significant gender differences in chronic disease are found for the entire sample, there are a number of interesting and potentially important interactions that involve gender. These findings are discussed below.

As expected, aging is the major risk factor for chronic diseases. Looking across the three age groups, results suggest a pattern of a decreasing gender gap of chronic disease with age, which is consistent with Gorman and Read's (2006) findings. The logistic regression analyses show that gender differences in chronic disease are significant only among young adults (Table 4.10), and this gender differential disappears among the middle-aged (Table 4.13) and the elderly groups (Table 4.16).

The effects of educational attainment on chronic diseases are difficult to interpret. While high school education appears to better protect young adults from chronic diseases, it increases the chance that middle-aged people will report chronic disease. Future research is needed to address this paradox. For elderly men, the highest educational attainment (junior high school or above) is a risk factor for chronic disease. One possible explanation for this phenomenon is that highly educated individuals survive mortality selection over the life course, so they have a greater chance to report chronic diseases.

Among the three types of employment, self-employment and familial employment in general yield more significant protective effects against chronic diseases. The associations between types of employment and chronic disease appear to vary by gender and age. Familial employment is significantly associated with a smaller chance of reporting chronic disease for women, especially for young and middle-aged women, but

not for men. Alternatively, men benefit more from self-employment and non-familial employment.

Compared to men, women's health outcomes are more likely to relate to their family roles. For instance, having unmarried children in the household is significantly associated with a lower risk of chronic ailments only for women. In addition, living with parents or in-laws is associated with either a greater or a smaller chance of reporting chronic disease for women (depending on age), but not for men. While having parents/in-laws in the household is associated with a lower risk of chronic ailments for young women, it seems to increase the probability of reporting chronic disease for middle-aged women. One plausible explanation is that young women can receive assistance from parents/in-laws in the form of baby-sitting, housework, etc., but middle-aged women would be responsible for taking care of elderly parents/in-laws. Men's health appears to be more associated with their paid work when they are young or in middle age. When they enter the later stage of the life course, their health is more associated with family factors. To illustrate, living with married children seems to be associated with more health benefits for elderly men than for elderly women.

The analyses of other interactions shed some light on the health effects of multiple roles. Results suggest that, while employment in general is associated with a smaller chance of reporting chronic disease than non-employment, multiple roles have an impact on a risk of chronic conditions. For instance, familial employed young women are about 60% less likely than their non-employed counterparts to report chronic disease. However, among familial employed young women, adding an unmarried child to the household is associated with about a 50% greater chance of reporting chronic disease (Table 4.11). In this case, health enhancement effects of paid work and health selection of the labor market can account for the first half of the results, and role strain hypothesis may explain

the other finding. In addition, the combination of certain types of employment and family factors (usually living arrangements) are more likely than other combinations to produce detrimental health outcomes. For instance, for young adults, the combination of non-familial employment and certain family factors (such as being married, living with parents/in-laws, or living with unmarried children) may even produce a higher risk of chronic diseases than being unemployed (see Tables 4.10 and 4.11). The analyses presented in this section lead us to conclude that, among the three types of employment, non-familial employment is the one most likely to produce detrimental health effects of multiple roles. On the other hand, the combinations of familial employment and family roles are less likely to yield negative health effects of multiple roles.

3. LIFE AFFECTED BY ILLNESS IN THE PAST TWO WEEKS

A. Descriptive Analyses

Table 4.19 presents the weighted proportion of Taiwanese adults who said their life was affected by illness within the last two weeks. As expected, people at the lowest level of education or family income are more likely to report their life was affected by recent illness. Men and women who are not currently employed also have a greater chance of reporting recent illness. The protective effect of marriage from recent illness is significant only for women. For both men and women, having unmarried children or parents/in-laws in the household is associated with a smaller chance of reporting life affected by recent illness. On the other hand, living with married children is linked to a greater chance of reporting recent illness. Heavy drinking and heavy smoking appear to be associated with a greater tendency toward recent illness for women, but not for men. Note that, in every comparison, women are more apt to report recent illness than are men.

Table 4.19. Weighted Proportion of Life Affected by Illness within Two Weeks by Gender for Taiwanese Adults

	Total	Men	Women
Educational attainment			
Junior high school or below	.29*	.23*	.33*
High school	.19*	.15*	.23*
Junior college or above	.17*	.14*	.21*
Marital Status			
Not-married	.24	.19	.31*
Married	.22	.17	.26*
Employment status			
Not currently employed	.31*	.28*	.32*
Self employed	.17*	.15*	.25*
Non-familial employment	.18*	.14*	.23*
Familial employment	.23*	.16*	.27*
Monthly family income			
Missing category	.26*	.14*	.34*
The 1st quarter income level	.29*	.26*	.32*
The 2nd quarter income level	.21*	.16*	.25*
The 3rd quarter income level	.20*	.15*	.26*
The 4th quarter income level	.18*	.12*	.24*
Living arrangement with unmarried children			
No unmarried children living in the household	.25*	.20*	.32*
One or more unmarried children living in the household	.21*	.16*	.25*
Living arrangement with married children			
No married children living in the household	.21*	.17†	.25*
One or more married children living in the household	.33*	.23†	.40*
Living arrangement with parents/in laws			
No parents/ in laws living in the household	.26*	.20*	.30*
One or more parents/ in laws living in the household	.19*	.15*	.23*
Alcohol drinking			
Non- or mild-drinkers	.23	.18	.28
Heavy drinkers	.20	.17	.38
Cigarettes smoking			
Non- or mild-smokers	.24*	.18	.27*
Heavy smokers	.18*	.17	.46*

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

Table 4.20 presents the weighted proportion of life affected by illness in the past two weeks for Taiwanese adults across three age groups. The protective effects of higher education and higher family income on recent illness are most evident among middle-aged people. The health benefits of employment, on the other hand, are significant across the three age groups. Being married is significantly associated with a lower risk of recent illness for elderly people, especially for elderly men. The effect of living arrangements is more evident among the middle-aged people, especially for women. For middle-aged people, having unmarried children and parents/in-laws in the household is linked to a smaller chance of reporting recent illness. It is probable that the social support offered by these family members helps to decrease the risk of illness. On the other hand, living with married children is associated with a higher risk of recent illness for middle-aged women and for young men. This implies that illness could cause parents to move in with married children. Heavy drinking and heavy smoking appear to increase the risk of recent illness for young women. Nevertheless, for middle-aged men and women, heavy drinking is linked to a smaller chance of reporting recent illness. One plausible explanation is that those who suffer from detrimental results of heavy drinking and heavy smoking in early years decide to stop these risky behaviors when they enter middle age.

B. Multivariate Analyses

a. Overall Gender Differences in Life Affected by Illness in the Past Two Weeks

Table 4.21 shows the odds ratios of life affected by illness within two weeks for Taiwanese adults. Significant gender differences in recent illness are displayed across the models. With only age adjusted (Model 1), men are 43.3% less likely than women to report life affected by illness in the past two weeks. As educational attainment is controlled in Model 2, gender differentials in recent illness decreases relatively by 3%

Table 4.20. Weighted Proportion of Life Affected by Illness within Two Weeks by Gender for Taiwanese Adults in Different Age Groups

	Aged 18 to 44			Aged 45 to 64			Aged 65 or over		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Educational attainment									
Junior high school or below	**.20**	**.15**	**.25**	**.27***	**.23***	**.31†**	**.42**	**.34**	**.48**
High school	**.18**	.14	.22	.18*	.15*	.22†	.30	.28	.39
Junior college or above	.18	.14	.22	.13*	.11*	.18†	.30	.31	.26
Marital status									
Not-married	.10	.15	.23	.29	.19	.34	.52*	.50*	.53
Married	.13	.13	.23	.23	.19	.28	.33*	.28*	.43
Employment status									
Not currently employed	.23*	.22*	.23	.29*	.26*	.31	.43†	.36	.49
Self employed	.13*	.09*	.23	.21*	.20*	.26	.25†	.24	.36
Non-familial employment	.18*	.14*	.23	.16*	.11*	.23	.30†	.31	.28
Familial employment	.16*	.09*	.20	.33*	.29*	.34	.36†	.27	.47
Monthly family income									
Missing category	.16	.10	.22	.26*	.16*	.29*	.44	.28	.49
The 1st quarter income level	.21	.17	.25	.34*	.29*	.39*	.41	.38	.42
The 2nd quarter income level	.18	.15	.21	.21*	.17*	.23*	.45	.38	.55
The 3rd quarter income level	.20	.15	.24	.20*	.14*	.25*	.41	.32	.52
The 4th quarter income level	.16	.11	.22	.19*	.13*	.26*	.33	.24	.43
Living arrangement with unmarried children									
No unmarried children living in the household	.18	.15	.23	.28*	.21	.33†	.42	.34	.49
One or more unmarried children living in the household	.19	.13	.23	.22*	.18	.26†	.37	.32	.44
Living arrangement with married children									
No married children living in the household	.19	.14*	.23	.23	.20	.26†	.40	.36	.44
One or more married children living in the household	.22	.56*	.00	.27	.14	.33†	.42	.29	.51
Living arrangement with parents/in laws									
No parents/ in laws living in the household	.19	.13	.23	.25†	.19	.30	.41	.33	.48
One or more parents/ in laws living in the household	.18	.15	.23	.18†	.16	.20	.55	.49	.59
Alcohol drinking									
Non- or mild-drinkers	**.18**	**.14**	**.22***	**.24**	**.19**	**.29**	**.41**	**.34**	**.48**
Heavy drinkers	**.20**	**.16**	**.42***	**.20**	**.20**	**.26**	**.00**	**.00**	**-**
Cigarettes smoking									
Non- or mild-smokers	.19	.14	.22*	.25*	.20	.29	.41	.56	.48
Heavy smokers	.16	.14	.51*	.16*	.16	.00	.42	.49	.65

Source: TSCS 4.1Q2 and 4.3 Q1

† $p < .10$; * $p<.05$ (One-way ANOVA)

Table 4.21. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Adults, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Male	.567***	.580***	.576***	.623***	.616***	.620***	.615***	.605***	.598***	.601***
Age	1.022***	1.018***	1.019***	1.016***	1.016***	1.015***	1.013***	1.013***	1.012**	1.013**
Educational attainment										
High school		.799*	.797*	.814†	.854	.856	.845	.850	.855	.848
Junior college or above		.772*	.736**	.740*	.808†	.810[m]	.783†	.792†	.778†	.783†
Marital Status										
Married			.715***	.747**	.755**	.743**	.808*	.809*	.661**	.815*
Employment status										
Self employed				.656**	.666**	.662**	.674**	.671**	.393***	.542**
Non-familial employment				.757**	.776*	.771*	.777*	.776*	.646**	.735*
Familial employment				.816	.827	.828	.835	.837	.513†	.759
Monthly family income										
Missing category					.774	.779	.772	.770	.761	.766
The 2nd quarter income level					.799*	.800*	.805*	.805*	.802*	.802*
The 3rd quarter income level					.881	.882	.888	.887	.882	.886
The 4th quarter income level					.768*	.773*	.775*	.774*	.780†	.772*
Living arrangement										
Number of parents/in-laws living in the household						.961	.943	.944	.942	.939
Number of unmarried children living in the household							.926†	.927†	.918*	.875*
Health Behavior										
Non- or mild- drinkers								.884	.885	.877
Non- or mild- smokers								.986	.976	.987
Interaction effects										
Married x self employment									2.040*	
Married x non-familial employment									1.339[m]	
Married x familial employment									1.913[m]	
Unmarried children living in the household x self-employment										1.185†
Unmarried children living in the household x non-familial employment										1.061
Unmarried children living in the household x familial employment										1.094
-2LL	3993.924	3987.472	3971.795	3958.277	3951.333	3950.961	3947.157	3946.622	3938.819	3943.717

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

(the proportional reduction in gender difference in health here is calculated by: [(1 – 0.580) - (1-0.567)] / (1 – 0.567) = - 0.030. The same method is applied in calculations of relative changes of gender differences in health discussed in this dissertation). When employment is controlled in Model 4, the gender gap in health continues to decrease relatively by about 11% ([(1 – 0.623) – (1 – 0.576)] / (1 – 0.567) = - 0.109). These results demonstrate that gender stratification in educational attainment and employment contributes to gender differentials in health outcomes. However, even in the full model of main effects (Model 8), men are still about 40% less likely than women to report recent illness. This suggests that some factors unexamined in this study account for the rest of gender differences in recent illness.

Looking at the full model of main effects (Model 8), we see an increase of one year in age leads to a 1.3% increase of risk of recent illness. Higher educational attainment, especially junior college or above, provides significant protective effects against recent illness. Married individuals are about 20% less likely than those unmarried to report recent illness. The odds of recent illness for the three types of employment relative to non-employment are all less than 1.0, but only self-employment and non-familial employment reach the significance level of 0.10. Higher family income also exhibits protective effects on recent illness. By observing Model 4 and Model 5, we find the effect of education on recent illness is partly mediated through the effect of family income. Lastly, having unmarried children in the household is significantly associated with a lower risk of recent illness.

Two terms are found significant in the test of interaction effects (Models 9 and 10). First, the significance of "married-by-self-employment" (Model 9) suggests that, among married people, those who are self-employed are 19.8% less likely than those who are not employed to report their life was affected by illness in the past two weeks (odds

ratio = 0.393 * 2.040 = 0.802). For self-employed individuals, those who are married are 34.8% more likely to report life affected by recent illness (odds ratio = 0.661 * 2.040 = 1.348). Second, the significance of "number of unmarried children in the household-by-self-employment" (Model 10) implies that, among people having unmarried children in the household, those who are self-employed are 35.8% less likely than those who are not employed to report recent illness (odds ratio = 0.542 * 1.185 = 0.642). For self-employed individuals, adding an unmarried child to the household increases by 3.7% the chance of reporting recent illness (odds ratio = 0.875 * 1.185 = 1.037). In addition, the interactions of "married-by-non-familial employment" and "married-by-familial employment" have p-values at the marginal significance level ($0.10 < p < 0.12$). Examining the odds ratios of these estimates yield similar results as those seen in the above two significant interaction terms. Specifically, with the same family roles, employed individuals are less likely than non-employed individuals to report recent illness. However, for employed individuals, additional family responsibilities are associated with a higher risk of recent morbidity. In theoretical terms, combining the notions of health enhancement of paid work, health selection of the labor market, and the role strain hypothesis provides a plausible explanation for these multiple role effects.

Table 4.22 presents odds ratios of life affected by illness in the past two weeks for Taiwanese women. Looking at the full model of main effects (Model 8), we find an increase of one year in age is associated with a 1.1% greater chance of reporting recent illness. Higher educational attainment is significantly associated with a lower risk of recent illness. Women who have a junior college or higher degree are 29.6% less likely than those in the reference category to report recent illness. Although marital status does not show a significant effect in Model 8, we have good reasons to argue that being married is associated with a lower risk of recent illness. Model 3 shows that married

Table 4.22. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Women, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	1.023***	1.019***	1.018***	1.017***	1.017***	1.015**	1.011*	1.012*
Educational attainment								
High school		.832	.818	.830	.845	.848	.821	.828
Junior college or above		.808	.740†	.750†	.765	.772	.704†	.724†
Marital Status								
Married			.747**	.748*	.755*	.740*	.827	.839
Employment status								
Self employed				.821	.816	.805	.820	.822
Non-familial employment				.887	.890	.884	.888	.893
Familial employment				.947	.948	.950	.965	.976
Monthly family income								
Missing category					.973	.981	.973	.976
The 2nd quarter income level					.873	.874	.882	.882
The 3rd quarter income level					1.009	1.011	1.027	1.015
The 4th quarter income level					.928	.933	.942	.943
Living arrangement								
Number of parents/in-laws living in the household						.948	.915	.915
Number of unmarried children living in the household							.882*	.884*
Health Behavior								
Non- or mild- drinkers								.649
Non- or mild- smokers								.441*
-2LL	2274.508	2272.226	2265.412	2263.940	2262.709	2262.314	2256.279	2249.771

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

women are 25.3% less likely than unmarried women to report recent illness. The effects of marital status on health remain significant from Model 3 through Model 6. After the number of unmarried children living in the household is controlled in Model 7, the effect of marriage becomes statistically insignificant. This suggests that the protective effect of marriage on recent illness is mediated, at least partly, through having unmarried children in the household, which is significant in Model 8. The effect of unmarried children living in household on women's health might be attributed to psychological support provided by children, or it can be explained by the fact that healthier women are more likely to give birth to more children. Lastly, female non-heavy smokers appear to have a lower risk of recent illness. No significant interaction effect is found for women.

Table 4.23 presents odds ratios of life affected by illness in the past two weeks among Taiwanese men. Looking at the full model of main effects (Model 8), we see that an increase of one-year of age is significantly associated with a 1.2% higher risk of recent illness. The odds of recent illness for the two higher levels of education relative to the lowest level are both less than 1.0, but these effects are not significant (Model 8). However, if we look at Model 2 through Model 4, we see higher educational attainment is significantly associated with a lower risk of recent illness. The effect of education on recent illness becomes insignificant after family income is controlled in Model 5, which suggests that the protective effects of educational attainment on health are mediated through higher family income. Also note that, although being married exhibits no significant effect on recent illness in Model 8, it is significantly associated with a lower risk of recent illness in Model 3 and Model 4. The effect of marital status on recent illness is probably mediated by family income (controlled in Model 5 and onward) and living arrangements with parents/in-laws (controlled in Model 6 and onward) and unmarried children (controlled in Models 7 and 8). Model 8 also shows that, compared to

Table 4.23. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Men, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Age	1.022***	1.017***	1.022***	1.014**	1.012*	1.012*	1.012*	1.012*	1.013*	1.014*
Educational attainment										
High school		.762†	.763†	.766[m]	.832	.832	.832	.831	.841	.831
Junior college or above		.735†	.733†	.691*	.799	.799	.800	.791	.787	.789
Marital Status										
Married			.649**	.784†	.790[m]	.786[m]	.784	.781	.571*	.622*
Employment status										
Self employed				.499***	.524***	.523****	.523***	.524**	.257**	.529**
Non-familial employment				.567**	.607**	.605**	.605**	.608**	.537**	.611**
Familial employment				.566†	.572†	.573†	.573†	.579†	.223*	.582†
Monthly family income										
Missing category					.485*	.486*	.486*	.488*	.498†	.496*
The 2nd quarter income level					.737†	.736†	.736†	.735†	.745†	.747†
The 3rd quarter income level					.751	.751	.751	.747	.757	.757
The 4th quarter income level					.615*	.617*	.617*	.615*	.633*	.627*
Living arrangement										
Number of parents/in-laws living in the household						.986	.987	.986	.991	.939
Number of unmarried children living in the household							1.001	1.004	.994	.652†
Health Behavior										
Non- or mild- drinkers								.937	.935	.941
Non- or mild- smokers								1.071	1.058	1.060
Interaction effects										
Married x self employment									2.678*	
Married x non-familial employment									1.323	
Married x familial employment									4.168†	
Married x number of parents living in the household										1.094
Married x number of unmarried children living in the household										1.608†
-2LL	1719.366	1715.016	1705.082	1719.366	1677.454	1677.436	1677.435	1677.172	1668.928	1672.569

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

those who are not employed, all three types of employment are significantly associated with a smaller chance of reporting recent illness. In addition, higher family income is associated with a lower risk of recent illness. This indicates that economic well-being is very important in decreasing men's risk of morbidity.

Model 9 and Model 10 in Table 4.23 display three significant interaction effects. First, the significance of "married-by-self-employment" (Model 9) suggests that, among married men, the self-employed are 31.2% less likely than the non-employed to report recent illness (odds ratio = 0.257 * 2.678 = 0.688). For self-employed men, being married is associated with a 52.9% greater chance of reporting recent illness (odds ratio = 0.571 * 2.678 = 1.529). Second, the significance of "married-by-familial employment"(Model 9) suggests that, among married men, the familial employed are 7.1% less likely than the non-employed to report recent illness (odds ratio = 0.223 * 4.168 = 0.929). For familial employed men, being married is linked to a 138.0% greater chance of reporting recent illness (odds ratio = 0.571 * 4.168 = 2.380). Finally, the significance of "married-by-number of unmarried children living in the household" (Model 10) indicates that, among married men, having an additional unmarried child in the household may increase by 4.8% the chance of reporting recent illness (odds ratio = 0.652 * 1.608 = 1.048). On the other hand, among the men having unmarried children in the household, the odds of recent illness for the married relative to the unmarried is 0.622 * 1.608 = 1.0002. An interpretation of the findings described immediately above is that being married has no substantial effect on recent illness for men who have unmarried children in the household. The above results suggest that, for Taiwanese men, while employment is associated with a smaller chance of reporting recent illness relative to non-employment, multiple roles do increase the risk of recent morbidity. Another noteworthy finding is

that, while having unmarried children in the household is associated with a lower risk of recent illness for women (see Table 4.22), it is associated with a higher risk for men.

Comparing Table 4.22 and 4.23, we find that the determinants of recent illness for women and for men are quite different. For women, higher educational attainment (junior college or above), number of unmarried children living in the household, and non-heavy smoking are found to be significant protective factors against recent illness in the full model of main effects (Model 8 in Table 4.22). For men, all three types of employment and higher family income are significant protective factors against recent illness. Aging is the only factor significantly related to a higher risk of recent illness for both men and women. The result of a *t*-test ($t \approx 0.00$) suggests that the aging effect on recent illness is not significantly different between women and men.

b. Gender Differences in Life Affected by Illness in the Past Two Weeks among Young Adults

Table 4.24 presents the odds ratios of life affected by illness within two weeks for Taiwanese adults aged 18 to 44. With age adjusted, young men are about 45% (Model 1) to 42% (Model 4) less likely than young women to report their life was affected by illness in the past two weeks. By controlling employment in Model 4, the gender gap in recent illness decreases relatively by about 6.2%. This implies that gender differences in employment may contribute to the differentials of recent illness between young men and young women. Also, controlling risky health behaviors in Model 8 results in a relative increase in the gender gap in recent illness by 8.5%. That is, gender differences in recent health could be even greater if men engaged in less consumption of alcohol and cigarettes.

Looking at the full model of main effects (Model 8), we find no significant effects of educational attainment on recent illness among young adults. As we will see later in

Table 4.24. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Adults Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Male	.551***	.551***	.553***	.581***	.583***	.588***	.584***	.546***	.526***	.533***	.524
Age	.991	.987[m]	.986	.989	.989	.987	.988	.989	.990	.991	.990
Educational attainment											
High school		.842	.842	.850	.882	.884	.874	.904	.913	.912	.903
Junior college or above		.809	.812	.797	.856	.857	.842	.894	.867	.874	.856
Marital Status											
Married			1.023	1.040	1.034	1.018	1.066	1.065	.731	1.068	1.089
Employment status											
Self employed				.649*	.661*	.658*	.659*	.645*	.432*	.839	.429*
Non-familial employment				.888	.903	.897	.894	.888	.705†	1.185	.697*
Familial employment				.666†	.677[m]	.682	.683	.684	.328*	.813	.407*
Monthly family income											
Missing category					.694	.704	.700	.691	.689	.688	.693
The 2nd quarter income level					.882	.884	.884	.879	.870	.877	.871
The 3rd quarter income level					.981	.985	.984	.977	.968	.976	.976
The 4th quarter income level					.801	.810	.805	.797	.806	.812	.809
Living arrangement											
Number of parents/in-laws living in the household						.956	.956	.955	.949	1.179	.946
Number of unmarried children living in the household							.963	.967	.966	.970	.799*
Health Behavior											
Non- or mild- drinkers								.730	.736	.728	.730
Non- or mild- smokers								.891	.873	.880	.878
Interaction effects											
Married x self employment									1.885		
Married x non-familial employment									1.539[m]		
Married x familial employment									2.898†		
Parents/in-laws living in the household x self employment										.753	
Parents/in-laws living in the household x non-familial employment										.753*	
Parents/in-laws living in the household x familial employment										.842	
Unmarried children living in the household x self-employment											1.345†
Unmarried children living in the household x non-familial employment											1.239*
Unmarried children living in the household x familial employment											1.432†
-2LL	2168.567	2166.298	2166.269	2159.999	2156.831	2156.464	2156.173	2153.113	2147.892	2148.955	2146.835

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table 4.27 and Table 4.30, higher education is significantly associated with a lower risk of recent illness for the middle-aged and elderly Taiwanese. This pattern demonstrates the "accumulating effects" of education (Mirowsky and Ross 2003; Ross and Wu 1996). That is, the health-related consequences of education accumulate gradually with age and become evident in later years of adulthood. In addition, while the odds of recent illness for the three types of employment relative to non-employment are all less than 1.0 in Model 8, only the one regarding self-employment is statistically significant. It shows that self-employed young adults are 35.5% less likely than non-employed ones to report recent illness. Marital status and living arrangements are not found to be significantly associated with the risk of recent illness among young adults.

Model 9 through Model 11 in Table 4.24 show the five significant interactions among young adults. (1) The significance of "married-by-familial employment" (Model 9) suggests that, among young married people, the familial employed are 4.9% less likely than the non-employed to report recent illness (odds ratio = 0.328 * 2.898 = 0.951). For young familial employed individuals, being married is associated with about a 111.8% greater chance of reporting recent illness (odds ratio = 0.731 * 2.898 = 2.118). (2) The significance of "number of parents/in-laws living in the household-by-non-familial employment" (Model 10) suggests that, among the young people with parents/in-laws living in the household, the non-familial employed are 10.8% less likely than the non-employed to report recent illness (odds ratio = 1.185 * 0.753 = 0.892). For young non-familial employed individuals, having an additional parent/in-law living in the household is associated with an 11.2% smaller chance of reporting recent illness (odds ratio = 1.179 * 0.753 = 0.888). (3) The significance of "number of unmarried children living in the household-by-self-employment" (Model 11) implies that, among young people with unmarried children living in the household, the self-employed are 42.3% less likely than

the non-employed to report recent illness (odds ratio = 0.429 * 1.345 = 0.577). For young self-employed individuals, having an additional child in the household may increase by 7.5% the chance of reporting recent illness (odds ratio = 0.799 * 1.345 = 1.075). (4) The significance of "number of unmarried children living in the household-by-non-familial employment" (Model 11) suggests that, among young people with unmarried children living in the household, the non-familial employed are 13.6% less likely than the non-employed to report recent illness (odds ratio = 0.697 * 1.239 = 0.864). For young non-familial employed individuals, adding an unmarried child to the household seems to cause no substantial effects on health (odds ratio = 0.799 * 1.239 = 0.990). (5) The significance of "number of unmarried children living in the household-by-familial employment" (Model 11) indicates that, among young people with unmarried children living in the household, the familial employed are 41.7% less likely than the non-employed to report recent illness (odds ratio = 0.407 * 1.432 = 0.583). For young familial-employed individuals, having an additional unmarried child in the household is linked to a 14.4% greater chance of reporting recent illness (odds ratio = 0.799 * 1.432 = 1.144). The above analyses of interaction effects suggest that, relative to non-employment, employment is consistently associated with a lower risk of recent illness among young adults. On the other hand, multiple roles (except for the combination of paid work and living with parents/in-laws) are likely to be associated with a higher risk of recent illness. These results support the role strain hypothesis.

Table 4.25 presents the odds ratios for life affected by illness within two weeks among Taiwanese women aged 18 to 44. Looking at the full model of main effects (Model 8), we see that odds ratios of recent illness for the two higher levels of education relative to the lowest level are both less than 1.0, but these effects are not significant. The three types of employment do not exhibit significant effects on recent illness, either. The

Table 4.25. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Women Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	.999	.994	.993	.993	.993	.990	.993	.997
Educational attainment								
High school		.845	.846	.837	.859	.863	.837	.871
Junior college or above		.792	.795	.779	.801	.805	.762	.822
Marital Status								
Married			1.019	1.030	1.031	.999	1.089	1.140
Employment status								
Self employed				1.003	.987	.972	.965	.970
Non-familial employment				1.039	1.036	1.027	1.020	1.044
Familial employment				.833	.833	.844	.845	.867
Monthly family income								
Missing category					.904	.922	.916	.883
The 2nd quarter income level					.855	.859	.854	.836
The 3rd quarter income level					1.032	1.036	1.034	.980
The 4th quarter income level					.913	.926	.918	.888
Living arrangement								
Number of parents/in-laws living in the household						.931	.930	.938
Number of unmarried children living in the household							.927	.917
Health Behavior								
Non- or mild- drinkers								.530
Non- or mild- smokers								.330*
-2LL	1246.820	1245.318	1245.306	1244.649	1243.580	1243.032	1242.272	1232.432

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

only factor significantly related to recent illness in Model 8 is smoking. Female non-heavy smokers are 67% less likely than female heavy smokers to report their life was affected by recent illness. No significant interaction effect is found for young women.

Table 4.26 shows the male model that is analogous to the model for females (Table 4.25). Looking at the full model of main effects (Model 8), we find no significant effects of educational attainment on recent illness. The three types of employment, on the other hand, display significant protective effects against recent illness. The three odds ratios regarding employment suggest that employed young men are at least 40% less likely than those who are not employed to report recent illness. No significant interaction effect is found for young men, either.

Comparing Table 4.25 and Table 4.26, we find that only few factors are significantly associated with recent illness among young men and young women. For young women, non-heavy smoking is associated with a lower risk of recent illness. For young men, all three types of employment are consistently related to a smaller chance of reporting recent illness.

c. Gender Differences in Life Affected by Illness in the Past Two Weeks among the Middle Aged

Table 4.27 presents the odds ratios of life affected by illness within two weeks among Taiwanese adults aged 45 to 64. Model 1 shows that, with age adjusted, middle-aged men are 43.4% less likely than middle-aged women to report life affected by recent illness. Controlling for education in Model 2 leads to a 14.1% relative decrease of gender differentials in recent illness. Marital status is controlled in Model 3, but makes no significant change in the gender differentials. The gender gap in health is further narrowed down relatively by 15.4% when employment is controlled in Model 4. These

Table 4.26. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Men Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	.980†	.977†	.974†	.984	.982	.983	.981	.980
Educational attainment								
High school		.843	.840	.865	.899	.899	.906	.941
Junior college or above		.859	.858	.785	.851	.851	.859	.913
Marital Status								
Married			1.078	1.224	1.191	1.197	1.131	1.117
Employment status								
Self employed				.334**	.357**	.358**	.354**	.347**
Non-familial employment				.592*	.607*	.609*	.609*	.606*
Familial employment				.345*	.341*	.340*	.339**	.339*
Monthly family income								
Missing category					.495	.492	.495	.493
The 2nd quarter income level					1.024	1.024	1.020	1.018
The 3rd quarter income level					.959	.957	.956	.950
The 4th quarter income level					.727	.724	.729	.721
Living arrangement								
Number of parents/in-laws living in the household						1.014	1.014	1.015
Number of unmarried children living in the household							1.045	1.057
Health Behavior								
Non- or mild- drinkers								.769
Non- or mild- smokers								.975
-2LL	920.166	919.517	919.406	906.920	902.796	902.782	902.657	901.568

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table 4.27. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Adults Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Male	.566***	.627**	.632**	.699*	.660*	.680*	.682*	.751	.762
Age	1.030*	1.020	1.019	1.010	1.006	1.002	1.001	1.000	1.003
Educational attainment									
High school		.678†	.676†	.701	.740	.737	.719	.723	.704
Junior college or above		.474**	.476**	.547*	.575†	.566†	.546*	.545*	.546*
Marital Status									
Married			.835	.807	.886	.884	.898	.885	1.093
Employment status									
Self employed				.824	.845	.852	.848	.844	.692
Non-familial employment				.607*	.634*	.638*	.629*	.631*	1.302
Familial employment				1.283	1.207	1.205	1.197	1.219	3.804
Monthly family income									
Missing category					.568[m]	.558[m]	.576	.576	.575
The 2nd quarter income level					.525**	.525**	.541**	.540**	.534**
The 3rd quarter income level					.538**	.531**	.550**	.546**	.560**
The 4th quarter income level					.654†	.658†	.690	.679[m]	.703
Living arrangement									
Number of parents/in-laws living in the household						.727[m]	.725[m]	.727[m]	.709†
Number of unmarried children living in the household							.955	.956	.963
Number of married children living in the household							.918	.922	.910
Health Behavior									
Non- or mild- drinkers								.962	.976
Non- or mild- smokers								1.424	1.474
Interaction effects									
Married x self employment									1.226
Married x non-familial employment									.404†
Married x familial employment									.295
-2LL	1152.314	1142.312	1141.492	1133.632	1119.862	1117.034	1116.383	1114.567	1109.781

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

results suggest that gender stratification in education and in the labor market in Taiwan society may contribute to gender differences in recent illness among middle-aged people.

Looking at the full model of main effects (Model 8), we see higher educational attainment is significantly related to a lower risk of recent illness. The odds of reporting recent illness for junior college or higher educated individuals relative to those without high school degree is 0.545. Among the three types of employment, non-familial employment is consistently associated with a lower risk of recent illness for middle-aged people. Higher family income is also significantly associated with a smaller chance of reporting recent morbidity. At the marginal level of significance ($0.10 < p < 0.12$), having parents/in-laws living in the household is associated with a lower risk of reporting recent illness.

Model 9 in Table 4.27 presents significant interactions regarding multiple roles for middle-aged people. The significant interaction term "married-by-non-familial employment" suggests that, among married middle-aged people, those who are non-familial employed are 47.4% less likely than those who are not employed to report recent illness (odds ratio = 1.302 * 0.404 = 0.526). For middle-aged non-familial employed individuals, being married is associated with a 55.8% smaller chance of reporting recent illness (odds ratio = 1.093 * 0.404 = 0.442). These results suggest that being married may provide social support or social control in regard to middle-aged working individuals.

Table 4.28 presents the odds ratios of life affected by illness in the past two weeks for Taiwanese women aged 45 to 64. Looking at the full model of main effects (Model 8), we see the odds of reporting recent illness for the two higher levels of education relative to the reference category are both substantially less than 1.0, but these effects are not significant. Considering the small sample size (61 women with a high school degree, and 47 with a junior college or higher degree) and the odds ratios exhibited, I would

Table 4.28. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Women Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Age	1.030	1.023	1.021	1.016	1.011	1.006	.994	.992	.999	.992	.991
Educational attainment											
High school		.710	.710	.724	.725	.725	.734	.768	.708	.744	.758
Junior college or above		.528[m]	.530[m]	.574	.557	.549	.554	.569	.557	.545	.574
Marital Status											
Married			.767	.726	.794	.820	.823	.805	1.168	.811	.805
Employment status											
Self employed				.827	.813	.794	.806	.811	1.117	.693	1.026
Non-familial employment				.777	.772	.778	.766	.783	1.859	.760	1.292
Familial employment				1.305	1.218	1.205	1.218	1.215	5 x 10^9	1.166	2.212†
Monthly family income											
Missing category					.622	.607	.620	.611	.580	.609	.615
The 2nd quarter income level					.519*	.517*	.537*	.534*	.529*	.538*	.519*
The 3rd quarter income level					.585*	.577*	.599†	.593†	.614†	.595†	.582†
The 4th quarter income level					.753	.756	.780	.757	.797	.744	.801
Living arrangement											
Number of parents/in-laws living in the household						.668	.677	.668	.643	.450[m]	.659
Number of unmarried children living in the household							.882	.876	.890	.874	1.034
Number of married children living in the household							1.018	1.019	.995	.1.025	1.043
Health Behavior											
Non- or mild- drinkers								1.471	1.450	1.524	1.194
Non- or mild- smokers								6 x 10^8	8 x 10^8	6 x 10^8	6 x 10^8
Interaction effects											
Married x self employment									.674		
Married x non-familial employment									.331†		
Married x familial employment									.000		
Parents/in-laws living in the household x self employment										8.861†	
Parents/in-laws living in the household x non-familial employment										1.640	
Parents/in-laws living in the household x familial employment										1.823	
Unmarried children living in the household x self-employment											.819
Unmarried children living in the household x non-familial employment											.663†
Unmarried children living in the household x familial employment											.597†
-2LL	679.782	676.191	674.984	672.514	664.819	662.765	660.780	658.516	651.983	655.065	652.382

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

suspect that higher education is associated with a lower risk of recent illness among middle-aged women. The odds of recent illness for the three types of employment relative to non-employment are all statistically insignificant. However, it warrants mention that the odds of recent illness for familial employed middle-aged women relative to non-employed middle-aged women is 1.215 (Model 8), compared to the same odds ratio for young women which is 0.867 (see Model 8 in Table 4.25). This noticeable difference suggests that the effect of familial employment for women varies with age. Model 8 also shows that higher family income is significantly related to a lower risk of recent illness. Marital status and living arrangements exhibit no significant effects on recent illness for middle-aged women.

Model 9 through Model 11 in Table 4.28 presents four significant interactions regarding multiple roles for middle-aged women. (1) The significance of "married-by-non-familial employment" (Model 9) indicates that, among married middle-aged women, the non-familial employed are 38.5% less likely than the non-employed to report recent illness (odds ratio = 1.859 * 0.331 = 0.615). For non-familial employed middle-aged women, being married is associated with a 61.3% smaller chance of reporting recent illness (odds ratio = 1.168 * 0.331 = 0.387). (2) The significance of "number of parents/in-laws living in the household-by-self-employment" (Model 10) suggests that, among middle-aged women who have parents/in-laws in the household, those who are self-employed are much more likely than those who are not employed to report recent illness (odds ratio = 0.693 * 8.861 = 6.141). Also, for self-employed middle-aged women, having an additional parent/in-law living in the household is associated with a much greater chance of reporting recent illness (odds ratio = 0.450 * 8.861 = 3.987). As mentioned before (on page 81), large magnitude of these odds ratios may result from a small sample size. (3) The significance of "number of unmarried children living in the

household-by-non-familial employment" (Model 11) suggests that, among middle-aged women with unmarried children living in the household, those who are non-familial employed are 14.3% less likely than those who are not employed to report recent illness (odds ratio = 1.292 * 0.663 = 0.857). For middle-aged non-familial employed women, having an additional child in the household is associated with a 31.4% smaller chance of reporting recent illness (odds ratio = 1.034 * 0.663 = 0.686). (4) The significance of "number of unmarried children living in the household-by-familial employment" (Model 11) implies that, among the middle-aged women with unmarried children living in the household, those who are familial employed are 32.1% more likely than those who are not employed to report recent illness (odds ratio = 2.212 * 0.597 = 1.321). For middle-aged familial employed women, adding an unmarried child to the household is linked to a 38.3% smaller chance of reporting recent illness (odds ratio = 1.034 * 0.597 = 0.617). These results indicate that a combination of employment with different family roles could produce different effects on middle-aged women's health. For middle-aged females, while combining paid-work and children is associated with health protective effects, combining employment with living with parents/in-laws is associated with a higher risk of recent morbidity. This could be due to the family roles played by middle-aged women. Compared with young women, middle-aged women may not need to spend as much time taking care of unmarried children (because they are probably already teenagers at least), but they may have to provide care for elderly parents/in-laws. In addition, family employment is associated with a higher risk of recent illness for middle-aged women. This is probably related to the relative longer working hours they have to spend in family businesses (see discussions in Chapter 5).

Table 4.29 presents the odds ratios of life affected by illness in the past two weeks for Taiwanese men aged 45 to 64. Looking at the full model of main effects (Model 8),

Table 4.29. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Men Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.030	1.014	1.014	.997	.998	.995	1.008	1.009	1.012
Educational attainment									
High school		.638	.638	.648	.727	.724	.680	.684	.691
Junior college or above		.430*	.430*	.532	.597	.592	.540	.544	.592
Marital Status									
Married			1.004	1.075	1.175	1.126	1.136	1.100	.415†
Employment status									
Self employed				.685	.761	.784	.785	.787	.781
Non-familial employment				.386**	.458*	.466*	.447*	.450*	.440*
Familial employment				1.078	1.209	1.225	1.305	1.391	1.426
Monthly family income									
Missing category					.434	.436	.487	.489	.461
The 2nd quarter income level					.568†	.566†	.606	.606	.649
The 3rd quarter income level					.498†	.490*	.535†	.527†	.561
The 4th quarter income level					.578	.578	.651	.631	.646
Living arrangement									
Number of parents/in-laws living in the household						.798	.811	.805	.349
Number of unmarried children living in the household							1.028	1.031	.321[m]
Number of married children living in the household							.648[m]	.653	.000
Health Behavior									
Non- or mild- drinkers								.891	.899
Non- or mild- smokers								1.369	1.350
Interaction effects									
Married x number of parents living in the household									2.499
Married x number of unmarried children living in the household									3.408†
Married x number of married children living in the household									2×10^{8}
-2LL	472.532	465.898	465.898	457.486	451.686	450.954	447.833	446.439	438.016

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

we see the odds of recent illness for the two higher levels of education relative to the reference category are both less than 1.0, but these effects are insignificant. Note that the highest level of education (junior college or above) is significantly associated with a lower risk of recent illness in Model 2 and Model 3. Its effect on health becomes insignificant after employment is controlled in Model 4. Thus, the beneficial effect of higher education on health is at least partly mediated by employment. Among the three types of employment, non-familial employment exhibits significant protective effects against recent illness. Model 8 shows that, for middle-aged men, the non-familial employed are 55% less likely than the non-employed to report recent illness. The odds of recent illness for self-employed men relative to non-employed men is also less than 1.0, but it is not significant. Nevertheless, the odds for familial employed men relative to non-employed men is 1.391. Although it is not significant, this may imply that familial employment yields fewer health benefits than other types of employment or even be associated with poorer health for middle-aged men.

One significant interaction effect on recent illness among middle-aged men is shown in Model 9. The significance of "married-by-number of unmarried children living in the household" implies that, for married middle-aged men, adding an unmarried child to the household is associated with a 9.4% greater chance of reporting recent illness (odds ratio = 0.321 * 3.408 = 1.094). Among middle-aged men having unmarried children in the household, being married is linked to a 41.4% greater chance of reporting recent illness (the odds ratio = 0.415 * 3.408 = 1.414). While the first odds ratio can be interpreted as a result of role overload, it is difficult to find a plausible explanation for the second odds ratio. Considering the social control and social support usually provided by marriage, it is puzzling why unmarried fathers would have better health than married fathers.

Comparing Table 4.28 and Table 4.29, we find middle-aged women and men share similar risk factors for recent illness. For middle-aged women, higher family income provides significant protective effects against recent illness. For middle-aged men, non-familial employment and higher family income are significantly associated with a lower risk of recent illness.

d. Gender Differences in Life Affected by Illness in the Past Two Weeks among the Elderly

Table 4.30 presents the odds ratios of life affected by illness in the past two weeks for Taiwanese adults aged 65 or over. Model 1 shows that with only age adjusted, elderly men are 45.6% less likely than elderly women to report life affected by illness in the past two weeks. Controlling for educational attainment in Model 2 decreases the gender differential relatively by 15.4%. When marital status is controlled in Model 3, the gender gap in health is narrowed down relatively by 22.8%. Further, with employment controlled in Model 4, the gender differences in recent illness become insignificant. Theses results suggest that education, marital status, and employment may account for differentials in recent illness between elderly men and women.

The full model of main effects (Model 8) shows that higher educational attainment (junior high school or above), being married, and self-employment are protective factors against recent illness for elderly people. Non-drinking is the only significant factor that is associated with a higher risk of recent illness for the elders. This finding is consistent with existing evidence that moderate drinking has protective effects against coronary heart disease and cognitive decline among the elders (Atkinson 2002). The interaction term "number of married children living in the household-by-non-familial employment" (Model 9) is found to be significant. This implies that, among elder people living with married children, those who are non-familial employed are 116.2% more

Table 4.30. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Adults Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Male	.544**	.614*	.718[m]	.797	.752	.755	.762	.800	.768
Age	1.014	1.014	.999	.993	.992	.992	.992	.991	.990
Educational attainment									
Elementary school		.953	1.013	1.031	1.045	1.047	1.052	1.040	1.051
Junior high school or above		.547*	.569†	.530*	.544†	.545†	.554†	.569†	.558†
Marital Status									
Married			.526**	.525**	.516**	.517**	.514**	.526**	.513**
Employment status									
Self employed				.492†	.490†	.486†	.480†	.470†	.387[1]
Non-familial employment				.615	.543	.544	.551	.539	.177*
Familial employment				.736	.706	.706	.698	.667	.539
Monthly family income									
Missing category					1.037	1.044	.986	.999	1.054
The 2nd quarter income level					1.529	1.538[m]	1.504	1.512	1.612†
The 3rd quarter income level					1.267	1.274	1.209	1.236	1.338
The 4th quarter income level					1.002	1.012	.941	.997	1.018
Living arrangement									
Number of unmarried children living in the household						.969	.986	.970	.931
Number of married children living in the household							1.082	1.059	.953
Health Behavior									
Nondrinkers								1.847†	1.795†
Non- or mild- smokers								.712	.727
Interaction effects									
Married children living in the household x self-employment									1.325
Married children living in the household x non-familial employment									12.214*
Married children living in the household x familial employment									1.362
-2LL	644.078	639.460	629.999	625.390	622.217	622.185	621.964	617.487	612.178

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

likely than those who are not employed to report recent illness (odds ratio = 0.177 * 12.214 = 2.162). For non-family employed elderly individuals, having a married child in the household is associated with a much greater chance of reporting recent illness (the odds ratio = 0.953 * 12.214 = 11.640). Results suggest that, for elderly people who live with married children, working could be an extra burden. These elders work probably because they need to provide financial resources for themselves, their married children, and possibly their grandchildren. An alternative explanation is that the elderly who are ill move in with their children. However, since the elderly person is holding down a job, the first interpretation seems more plausible.

Table 4.31 shows the odds ratios for life affected by illness within two weeks among Taiwanese women aged 65 or over. Looking at the full model of main effects (Model 8), we see the odds of recent illness for junior high school graduates to individuals with less than elementary school education is 0.399, but it is not significant. Note that the same odds ratios in Model 4 through Model 7 have a marginal level of significance ($0.10 < p < 0.12$). Thus, education is likely to be associated with a lower risk of recent illness for elderly women. In addition, married elderly women are about 40% less likely than unmarried elderly women to report their life was affected by illness in the past two week. No significant interaction is found for elderly women.

Table 4.32 presents the odds ratio of life affected by illness within two weeks for Taiwanese men aged 65 or over. Looking at the full model of main effects (Model 8), we see being married is associated with a lower risk of recent illness. Married elderly men are 56.7% less likely than unmarried men to report life affected by illness in the past two weeks. The odds of reporting recent illness for abstainers relative to drinkers is 2.045. This finding is not totally unexpected. Some studies have shown that moderate drinking is associated with a higher level of physical functioning (Guralnik and Kaplan. 1989) and

Table 4.31. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Women Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	1.007	1.003	.993	.985	.983	.982	.983	.982
Educational attainment								
Elementary school		.939	.978	.982	.974	.978	.982	.989
Junior high school or above		.422	.424	.410[m]	.390[m]	.391[m]	.397[m]	.399
Marital Status								
Married			.654	.619†	.603†	.603†	.601†	.596†
Employment status								
Self employed				.467	.537	.533	.527	.523
Non-familial employment				.355	.267	.268	.277	.278
Familial employment				.882	.877	.882	.881	.878
Monthly family income								
Missing category					1.292	1.301	1.221	1.223
The 2nd quarter income level					1.979†	1.991†	1.925[m]	1.885
The 3rd quarter income level					1.548	1.553	1.450	1.453
The 4th quarter income level					1.266	1.275	1.173	1.182
Living arrangement								
Number of unmarried children living in the household						.957	.984	.988
Number of married children living in the household							1.089	1.083
Health Behavior								
Nondrinkers								1.140
Non- or mild- smokers								.710
-2LL	334.824	332.276	329.899	327.585	324.407	324.383	324.252	324.162

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table 4.32. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Men aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Age	1.023	1.026	1.006	1.002	1.001	1.001	1.000	1.000
Educational attainment								
Elementary school		.999	1.102	1.088	1.136	1.136	1.140	1.082
Junior high school or above		.605	.652	.585	.639	.639	.648	.649
Marital Status								
Married			.390**	.402**	.403**	.403**	.400**	.433*
Employment status								
Self employed				.521	.520	.521	.514	.503
Non-familial employment				.940	.901	.901	.901	.886
Familial employment				.639	.605	.606	.595	.541
Monthly family income								
Missing category					.695	.694	.663	.676
The 2nd quarter income level					1.229	1.227	1.217	1.242
The 3rd quarter income level					1.080	1.078	1.051	1.096
The 4th quarter income level					.777	.775	.742	.827
Living arrangement								
Number of unmarried children living in the household						1.006	1.014	.968
Number of married children living in the household							1.056	1.011
Health Behavior								
Non-drinkers								2.045†
Non- or mild- smokers								.713
-2LL	309.020	306.479	297.705	294.943	293.463	293.463	293.417	288.742

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

reduced risk of coronary artery disease (Ashley et al. 1994). Also, some abstained elders may stop drinking because of illness.

Comparing Table 4.31 and Table 4.32, it is not surprising that the common risk factor for recent illness for both elderly men and women is being currently married. As most elderly individuals are retired, the effects of family life are likely to be highly associated with health outcomes. Existing studies suggest that marriage provides social control on risky health behaviors, as well as social support (Broms et al. 2004; Roos et al. 1998). Also, a transition out of marriage is associated with an increase in negative health behaviors (Umberson 1992). The result of a *t*-test ($t = 0.72$) suggests that, at the level of 0.05, the protective effects of marriage on recent illness for men and women are not significantly different.

C. Summary

To summarize, gender differences in life affected by recent illness are found in all three age groups. In each age group, men are about 45% less likely than women to report recent illness. The gender gap does not decrease with age. Apparently, gender stratification on education and employment does contribute to gender differentials in recent illness to some degree.

Men and women display different risk factors for recent illness. For women, higher educational attainment, number of unmarried children living in the household, and non-heavy smoking are the most significant protective factors against recent illness. For men, all three types of employment and higher family income are the most significant protective factors. Also, different sets of social factors are found in each age group to (partly) account for gender differences in recent illness. For young adults, familial employment and self-employment significantly contribute to the gender differentials in health. For middle-aged people, educational attainment, non-familial employment, and

family income partly define the gender gap in health. For the elderly, educational attainment, marital status, and self-employment substantially explain the differences in male and female morbidity.

For all three age groups, employment is the most prominent factor related to a lower risk of recent illness. The beneficial effects of self-employment and non-familial employment on health might be partially due to economic benefits and partly due to health selection of the labor market. The health effect of familial employment, on the other hand, is probably mediated through the length of working hours and the supportive working environment (see discussions in Chapter 5).

Higher educational attainment is significantly associated with a lower risk of recent illness among the middle-aged and elderly people, but not among young adults. One plausible explanation is that the health-related consequences of education accumulate gradually with age and become more evident in later years of adulthood (Mirowsky and Ross 2003; Ross and Wu 1996).

Analyses of interaction effects reveal that the impacts of multiple roles on recent illness exhibit a common pattern. In general, with the same family roles, employed individuals are less likely than non-employed individuals to report recent illness. This could be partly due to health selection of the labor market and partly due to economic well-being provided by paid work. On the other hand, for employed individuals, additional family responsibilities are associated with a higher risk of recent morbidity. These findings support the role strain hypothesis. In addition, depending on the social context, the same combination of work and family roles could produce different health consequences. For instance, the combination of employment and living with parents/in-laws is associated with better health for young adults, but poorer health for middle-aged women. Also, while familial employment is likely associated with a lower risk of recent

illness for young women, it is related to a higher risk for middle-aged women. The implication is that, while the role strain hypothesis is supported in most cases, the effects of multiple roles on health still vary in different social and demographic contexts.

4. SELF-RATED HEALTH

A. Descriptive Analyses

Table 4.33 presents the proportions of poor self-rated health for Taiwanese adults. As expected, people who have lower educational attainment, who are not employed, or who have lower family income are more likely to report poorer health. The differences between married and unmarried people in self-rated health are significant only for women. Married women are less likely than unmarried women to report poor health status. Having parents/in-laws or unmarried children living in the household is associated with a smaller chance of reporting poor health. On the other hand, living with married children is related to a greater likelihood of reporting poorer health, probably because married children provide a more stable household where care can be provided for elderly parents who are ill or disabled. Heavy drinking and heavy smoking are found to be associated with a greater chance of poorer health only for women, not for men.

Table 4.34 are weighted proportions in poor self-rated health for Taiwanese adults in three different age groups. People with lower educational attainment or lower family income in general report poorer health status in each age group. The differentials in self-rated health between employed and non-employed individuals are more significant for the young and middle-aged groups. On the other hand, being currently married is associated with a smaller chance of reporting poor health for middle-aged and elderly people. Having unmarried children living in the household appears to have different effects on health for the young and middle-aged people. For young people, especially young men,

Table 4.33. Weighted Proportion of Poor Health by Gender for Taiwanese Adults

	Total	Men	Women
Educational attainment			
Junior high school or below	.26*	.22*	.30*
High school	.14*	.09*	.20*
Junior college or above	.12*	.09*	.16*
Marital Status			
Not-married	.20	.13	.27*
Married	.19	.15	.22*
Employment status			
Not currently employed	.26*	.21*	.28*
Self employed	.16*	.12*	.24*
Non-familial employment	.15*	.12*	.19*
Familial employment	.18*	.10*	.23*
Monthly family income			
Missing category	.26*	.10*	.35*
The 1st quarter income level	.28*	.24*	.31*
The 2nd quarter income level	.15*	.10*	.20*
The 3rd quarter income level	.16*	.11*	.21*
The 4th quarter income level	.12*	.10*	.15*
Living arrangement with unmarried children			
No unmarried children living in the household	.21*	.14	.30*
One or more unmarried children living in the household	.17*	.15	.20*
Living arrangement with married children			
No married children living in the household	.18*	.14†	.22*
One or more married children living in the household	.28*	.19†	.34*
Living arrangement with parents/in laws			
No parents/ in laws living in the household	.23*	.17*	.27*
One or more parents/ in laws living in the household	.14*	.11*	.17*
Alcohol drinking			
Non- or mild-drinkers	.20	.15	.24*
Heavy drinkers	.16	.13	.41*
Cigarettes smoking			
Non- or mild-smokers	.20†	.14	.24*
Heavy smokers	.17†	.16	.38*

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

Table 4.34. Weighted Proportion of Poor Health by Gender for Taiwanese Adults in Different Age Groups

	Aged 18 to 44			Aged 45 to 64			Aged 65 or over		
	Total	Men	Women	Total	Men	Women	Total	Men	Women
Educational attainment									
Junior high school or below	.18†	.15*	.20	.27*	.22*	.30*	.37*	.30	.42
High school	.15†	.09*	.20	.13*	.10*	.18*	.17*	.14	.31
Junior college or above	.13†	.10*	.17	.07*	.06*	.11*	.18*	.19	.00
Marital status									
Not-married	.14	.10	.20	.30*	.23	.35†	.43*	.39*	.45
Married	.16	.12	.18	.21*	.16	.26†	.29*	.24*	.38
Employment status									
Not currently employed	.17*	.12*	.20	.28*	.25*	.29	.36	.28	.42
Self employed	.13*	.08*	.24	.17*	.16*	.23	.24	.22	.36
Non-familial employment	.15*	.13*	.18	.15*	.10*	.22	.30	.31	.28
Familial employment	.08*	.00*	.14	.30*	.24*	.32	.39	.32	.47
Monthly family income									
Missing category	.18*	.08†	.29*	.33*	.13*	.39*	.33†	.14	.39
The 1st quarter income level	.20*	.16†	.23*	.36*	.27*	.44*	.43†	.39	.45
The 2nd quarter income level	.13*	.09†	.16*	.19*	.20*	.19*	.37†	.30	.48
The 3rd quarter income level	.15*	.09†	.21*	.16*	.09*	.21*	.32†	.23	.43
The 4th quarter income level	.12*	.10†	.13*	.12*	.08*	.17*	.25†	.21	.29
Living arrangement with unmarried children									
No unmarried children living in the household	.13†	.09†	.19	.29*	.17	.39*	.35	.27	.43
One or more unmarried children living in the household	.16†	.13†	.19	.19*	.16	.21*	.31	.29	.35
Living arrangement with married children									
No married children living in the household	.15	.11	.19	.21	.17	.25	.36	.31	.43
One or more married children living in the household	.00	.00	.00	.25	.15	.31	.33	.23	.41
Living arrangement with parents/in laws									
No parents/ in laws living in the household	.17*	.12	.21†	.23	.16	.28	.35	.28	.42
One or more parents/ in laws living in the household	.13*	.10	.17†	.19	.17	.22	.26	.33	.21
Alcohol drinking									
Non- or mild-drinkers	.15	.11	.18*	.23	.17	.27	.35	.28	.42
Heavy drinkers	.16	.11	.46*	.16	.15	.26	.00	.00	-
Cigarettes smoking									
Non- or mild-smokers	.15	.10†	.18*	.23	.17	.27	.35	.26	.41
Heavy smokers	.15	.13†	.41*	.16	.16	.00	.35	.33	.65

Source: TSCS 4.1Q2 and 4.3 Q1

† p < .10; * p<.05 (One-way ANOVA)

having unmarried children in the household is associated with a greater likelihood of reporting poor health. For the middle-aged, especially for middle-aged women, having unmarried children living in the household is associated with a smaller chance of reporting poor health. Having parents/in-laws in the household is not significantly associated with poor health. Regarding risky health behaviors, heavy drinking is associated with a greater chance of reporting poor health for young women, and heavy smoking is associated with poorer health status for young men and young women.

B. Multivariate Analyses

a. Overall Gender Differences in Self-rated Health

Table 4.35 presents odds ratios for differences in poor self-rated health. Model 1 shows that with age adjusted, men are 46.4% less likely than women to evaluate their own health as poor. Controlling for education in Model 2 reduces the gender differences in health relatively by 5.0%. Adjusting marital status in Model 3 makes no noticeable change in the gender differentials. Further, with employment controlled in Model 4, the gender gap narrows down relatively by 4.7%. In the full model of main effects (Model 9), we see that chronic disease and recent illness combined account for 15.3% of gender differences relatively in self-rated health, but the gender gap in health is still evident. We find the odds ratios do not change substantially across these progressive adjusted models. This implies that some factors that are not included in these models must contribute to gender differences in health in Taiwan.

Looking at Model 8, we see the most significant risk factor for poor self-rated health is age, as expected. An additional year of age is associated with 1.4% higher risk of reporting poor health. Higher education, higher family income, as well as number of parents/in-laws and number of unmarried children living in the household are all

Table 4.35. Odds Ratio for Poor Self-rated Health, Taiwanese Adults, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Male	.536***	.559***	.557***	.579***	.566***	.578***	.574***	.538***	.609***	.615***
Age	1.028***	1.020***	1.021***	1.020***	1.019***	1.016***	1.014***	1.014***	1.004	1.005
Educational attainment										
High school		.699**	.694**	.693**	.787*	.793†	.782*	.790†	.830	.831
Junior college or above		.609***	.582***	.573***	.712*	.720*	.696*	.721*	.776	.783
Marital Status										
Married			.747**	.768**	.810*	.777**	.835†	.841[m]	.928	.911
Employment status										
Self employed				.788†	.828	.815	.828	.820	1.021	1.329
Non-familial employment				.910	.985	.968	.974	.968	1.138	1.216
Familial employment				.781	.811	.815	.820	.815	.887	1.123
Monthly family income										
Missing category					.831	.847	.840	.832	.908	.911
The 2nd quarter income level					.583***	.584***	.587***	.587***	.570***	.575***
The 3rd quarter income level					.681**	.683**	.688**	.689**	.652**	.655**
The 4th quarter income level					.526***	.535***	.536***	.536***	.523***	.527***
Living arrangement										
Number of parents/in-laws living in the household						.895[m]	.879†	.880†	.901	.909
Number of unmarried children living in the household							.933†	.932†	.966	1.049
Health Behavior										
Non- or mild- drinkers								.981	1.081	1.098
Non- or mild- smokers								.809	.775[m]	.775
Health Conditions										
Chronic Diseases									1.851***	1.871***
Life affected by illness within two weeks									10.795***	10.864***
Interaction effects										
Unmarried children living in the household x self-employment										.807†
Unmarried children living in the household x non-familial employment										.931
Unmarried children living in the household x familial employment										.820
-2LL	3603.014	3585.228	3574.861	3570.645	3538.547	3536.078	3533.293	3530.932	2783.008	2779.248

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

significantly associated with a lower likelihood of reporting poor health. Being currently married is significantly related to a lower chance of poor self-rated health in Model 3 through Model 7. Even in Model 8, the effect of marriage on health is still at the marginal level of significance ($0.10 < p < 0.12$). Thus, it is reasonable to regard marital status as a protective factor against poor health, (or as helping to produce good health). Self-employment is significantly associated with a smaller chance of reporting poor health in Model 4, but its effect on health becomes insignificant after family income is controlled in Model 5. Model 9 shows that chronic disease and recent illness, especially the latter, are significant predictors of poor self-rated health. Comparing Model 9 with Model 8, we find the effects of age, education, marital status, and living arrangements with parents/in-laws or unmarried children on self-rated health are substantially mediated through chronic disease and recent illness. Model 10 shows the significant interaction effects found on self-rated health. The significance of "number of unmarried children living in the household-by-self-employment" suggests that, among people with unmarried children living in the household, the self-employed are about 7.3% more likely than the non-employed to evaluate their health as poor (odds ratio = 1.329 * 0.807 = 1.073). Among self-employed individuals, adding an unmarried child to the household is associated with about a 15.3% lower risk of reporting poor health (odds ratio = 1.049 * 0.807 = 0.847).

Table 4.36 presents odds ratios of poor self-rated health for Taiwanese women. Looking at Model 8, we see that the increase of one year in age is associated with a 1.5% higher risk of reporting poor health. Higher educational attainment does not show significant effects on health in Model 8. However, note that from Model 2 through Model 4, a degree of junior college or above is associated with a significantly smaller chance of reporting poor health for women. The educational effect becomes insignificant when family income is controlled in Model 5. Thus, for women, the protective effect of higher

Table 4.36. Odds Ratio for Poor Self-rated Health, Taiwanese Women, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.027***	1.023***	1.022***	1.021***	1.021***	1.018***	1.013*	1.015**	1.006
Educational attainment									
High school		.886	.867	.883	1.022	1.033	.997	1.015	1.207
Junior college or above		.725†	.655*	.672*	.867	.889	.799	.827	.994
Marital Status									
Married			.718**	.717**	.769*	.738*	.831	.843	.921
Employment status									
Self employed				1.004	1.029	1.000	1.017	1.022	1.225
Non-familial employment				.874	.932	.917	.920	.925	.980
Familial employment				.902	.953	.956	.969	.983	1.035
Monthly family income									
Missing category					1.075	1.094	1.086	1.096	1.141
The 2nd quarter income level					.658**	.660**	.667**	.663**	.603**
The 3rd quarter income level					.772	.774	.788	.777	.698†
The 4th quarter income level					.494***	.499***	.505***	.505***	.421***
Living arrangement									
Number of parents/in-laws living in the household						.888	.851†	.850†	.884
Number of unmarried children living in the household							.868**	.870*	.912
Health Behavior									
Non- or mild- drinkers								.405*	.430†
Non- or mild- smokers								.555	1.008
Health Conditions									
Chronic Diseases									1.789***
Life affected by illness within two weeks									10.946***
-2LL	2102.775	2099.398	2091.481	2090.344	2070.797	2069.109	2062.207	2054.082	1602.528

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

education on self-rated health is mediated through higher family income. Being married is significantly associated with a lower risk of poor health in Model 3 through Model 6, and becomes insignificant in Model 7 when number of unmarried children living in the household is controlled. Thus, for women, the health impact of marriage on health is partly mediated through children. It is surprising that the three types of employment are not significantly associated with women's health status in Model 8. This indicates that, in general, employed women do not report significantly better health than homemakers. Model 8 also shows that higher family income is significantly associated with a lower risk of poor health. Also, having parents/in-laws or unmarried children in the household is associated with at least a 15% smaller likelihood of reporting poor health (Model 8). The health protective effects displayed by marriage and living arrangements with unmarried children and parents/in-laws show that family roles provide strong social support for women, which in turn enhances their health. Last, non-heavy female drinkers are about 60% less likely than heavy drinkers to report poor health (Model 8). Model 9 shows that the effects of age, marital status, as well as living arrangements with parents/in-laws or children on self-rated health are mediated through chronic disease and recent illness. No significant interaction effect on self-rated health is found for women.

Table 4.37 presents odds ratios of poor self-rated health for Taiwanese men. Looking at Model 8, we see that one additional year increase in age is associated with a 1.3% higher risk of poor health. The odds of reporting poor health for the two higher levels of education relative to the reference category are both substantially less than 1.0 and significant in Model 8. Higher educational attainment may therefore be crucial for men in reducing the risk of poor health. In Model 8 we find that, while self-employment and familial employment are significantly associated with a smaller chance of poor health, non-familial employment is not. Higher family income is significantly associated

Table 4.37. Odds Ratio for Poor Self-rated Health, Taiwanese Men, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Age	1.028***	1.018***	1.020***	1.017***	1.014**	1.012†	1.013*	1.013*	1.002	1.001
Educational attainment										
High school		.500***	.498***	.479***	.540**	.543**	.546**	.546**	.517**	.515**
Junior college or above		.499***	.495***	.457***	.547**	.547**	.552**	.564**	.576*	.575*
Marital Status										
Married			.773†	.852	.893	.859	.814	.826	.923	.899
Employment status										
Self employed				.613*	.659*	.654*	.646*	.644*	.887	1.446
Non-familial employment				.875	.982	.964	.955	.942	1.358	1.522
Familial employment				.503†	.514†	.518†	.516†	.501†	.600	.683
Monthly family income										
Missing category					.409*	.417*	.419*	.415*	.487[m]	.479[m]
The 2nd quarter income level					.478***	.477***	.474***	.475***	.498**	.497**
The 3rd quarter income level					.563**	.565**	.563**	.569*	.562*	.560*
The 4th quarter income level					.567**	.577*	.576*	.580*	.659†	.653†
Living arrangement										
Number of parents/in-laws living in the household						.910	.917	.919	.927	.935
Number of unmarried children living in the household							1.042	1.037	1.048	1.314*
Health Behavior										
Non- or mild- drinkers								1.227	1.368	1.445
Non- or mild- smokers								.849	.771	.774
Health Conditions										
Chronic Diseases									1.990***	2.005***
Life affected by illness within two weeks									10.952***	11.260***
Interaction effects										
Unmarried children living in the household x self-employment										.627*
Unmarried children living in the household x non-familial employment										.811
Unmarried children living in the household x familial employment										.805
-2LL	1500.230	1479.496	1476.594	1467.496	1447.376	1446.674	1446.295	1444.722	1152.869	1146.852

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

with a lower risk of poor health. For men, the effects of family roles on health status seem not as prominent as those for women. This is consistent with the view of women as primary caregivers in the home. Marital status and living arrangements do not exhibit significant associations with self-rated health. Comparing Model 9 with Model 8, we find that, although the effect of employment on self-rated health is substantially mediated through chronic disease and recent illness, the effects of education and family income remain significant. Model 10 shows one significant interaction effect for self-rated health among men. The significance of "number of unmarried children living in the household-by-self-employment" suggests that with the same number of unmarried children living in the household, self-employed men are about 9.3% less likely than non-employed men to evaluate their health as poor (odds ratio = 1.446 * 0.627 = 0.907). Also, for self-employed men, adding an unmarried child to the household is associated with a 17.6% smaller chance of reporting poor health. One possible explanation is that unmarried children could provide both domestic and business assistance for self-employed men. Additional information is needed to test this hypothesis.

Table 4.36 and Table 4.37 clearly show that different sets of social and behavioral factors define health for each gender group. While female health status is more likely associated with family factors, male health is more apt to be linked to paid work. For women, higher family income, number of parents/in-laws in the household, number of unmarried children in the household, and non-heavy drinking are protective factors against poor health (Model 8 in Table 4.36). For men, higher education, self-employment, familial employment, and higher family income are protective factors (Model 8 in Table 4.37).

b. Gender Differences in Self-rated Health among Young Adults

Table 4.38 presents odds ratios for poor self-rated health for young adults aged 18 to 44. Model 1 shows that, with age adjusted, young men are 46.5% less likely than young women to report poor health. When heavy drinking and heavy smoking are controlled in Model 8, the gender gap in health increases relatively about 16.8%. This implies that young men might report even better health status than young women, if they engaged in fewer risky health behaviors. In addition, controlling for chronic disease and recent illness in Model 9 reduces the gender differentials relatively by 26.2%. This suggests that the higher prevalence of these two kinds of morbidity among young women contribute substantially to gender differences in self-rated health among young adults. As we will see later, this pattern is not evident among the middle-aged and elderly groups.

Looking at Model 8, we find no significant effect of education on self-rated health among young adults. Note that the highest level of education (junior college or above) is significantly associated with a lower risk of poor health in Model 2 through Model 4. Its effect becomes insignificant when family income is controlled in Model 5. Again the implication is that the effect of higher educational attainment on self-rated health is largely mediated through higher family income. Model 8 also demonstrates that familial employment is significantly associated with a lower risk of poor health. Young familial employed individuals are 52.7% less likely than their non-employed counterparts to evaluate their health as poor. As self-employment and non-familial employment are not significantly associated with self-rated health, we may argue that, for young working individuals, familial employment yields more health benefits than the other two types of employment. Regarding family role factors, while being currently married is not significantly associated with young people's health, living with parents/in-laws is. In Model 8, net of other effects, living with parents/in-laws is associated with a 13.5%

Table 4.38. Odds Ratio for Poor Self-rated Health among Taiwanese Adults Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Male	.535***	.538***	.531***	.531***	.535***	.550***	.546***	.468***	.590**	.623**
Age	1.015†	1.010	1.013	1.014	1.013	1.006	1.009	1.008	1.015	1.014
Educational attainment										
High school		.830	.831	.818	.914	.921	.908	.951	1.059	1.046
Junior college or above		.759†	.751†	.719*	.855	.858	.838	.931	1.020	1.047
Marital Status										
Married			.913	.931	.975	.920	.975	.978	.919	1.429
Employment status										
Self employed				.851	.921	.904	.907	.879	1.056	1.468
Non-familial employment				.986	1.073	1.049	1.045	1.033	1.074	1.476
Familial employment				.431**	.464*	.474*	.475*	.473*	.523†	.773
Monthly family income										
Missing category					.996	1.044	1.037	1.006	1.197	1.174
The 2nd quarter income level					.612**	.616**	.615**	.613**	.580**	.588**
The 3rd quarter income level					.765	.774	.773	.769	.734	.738
The 4th quarter income level					.592**	.613*	.609*	.600**	.615*	.608*
Living arrangement										
Number of parents/in-laws living in the household						.868†	.867†	.865†	.876	.883
Number of unmarried children living in the household							.954	.961	.985	.982
Health Behavior										
Non- or mild- drinkers								.801	.944	.943
Non- or mild- smokers								.680†	.701[m]	.715
Health Conditions										
Chronic Diseases									2.108***	2.154***
Life affected by illness within two weeks									10.996***	11.141***
Interaction effects										
Married x self employment										.584
Married x non-familial employment										.570†
Married x familial employment										.550
-2LL	1891.741	1888.690	1888.294	1878.648	1866.614	1863.575	1863.178	1857.084	1484.237	1481.325

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

smaller chance of reporting poor health. Model 10 shows significant interaction effects on self-rated health among young adults. The significance of "married-by-non-familial employment" suggests that, among married young adults, the non-familial employed are about 16% less likely than the non-employed to evaluate their health as poor (odds ratio = 1.476 * 0.570 = 0.841). Also, among young non-familial employed individuals, being married is associated with an 18.5% lower risk of poor health (odds ratio = 1.429 * 0.570 = 0.815). These results support the role accumulation hypothesis. That is, with chronic disease and recent illness controlled, multiple roles are associated with a smaller likelihood of poorer health for young adults.

Table 4.39 presents the odds ratios of poor self-rated health among Taiwanese women aged 18 to 44. Looking at Model 8, we find that higher educational attainment is not significantly associated with young women's self-rated health. Note that the odds of poor health for the highest educational attainment (junior college or above) relative to the reference category are substantially less than 1.0 in Model 2 through Model 4. With family income is controlled in Model 5, the odds ratio of health between the highest and the lowest educational level becomes close to 1.0. This implies that the protective effect of junior college or higher degree on self-rated health is partly mediated by higher family income. The three types of employment are not significantly associated with self-rated health in Model 8. However, the comparison of these three odds ratios shows that familial employment may be associated with a lower risk of poor health than the other two types of employment. Higher family income is significantly associated with a lower risk of poor health in Model 8. Model 8 also shows that, for young women, living with additional parents/in-laws is associated with a 16.3% smaller chance of reporting poor health. The implication is that parents living in the household may provide substantial emotional or financial support for young women. Lastly, non-heavy drinking and non-

Table 4.39. Odds Ratio for Poor Self-rated Health among Taiwanese Women Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.011	1.008	1.014	1.014	1.015	1.006	1.008	1.013	1.021
Educational attainment									
High school		1.034	1.028	1.034	1.180	1.191	1.161	1.228	1.533†
Junior college or above		.857	.813	.821	.997	1.010	.966	1.051	1.263
Marital Status									
Married			.799	.794	.831	.771	.827	.871	.765
Employment status									
Self employed				1.250	1.304	1.252	1.246	1.248	1.322
Non-familial employment				.882	.944	.922	.917	.929	.853
Familial employment				.618	.676	.697	.698	.715	.776
Monthly family income									
Missing category					1.445	1.527	1.521	1.516	1.770
The 2nd quarter income level					.660†	.670†	.667†	.650†	.588*
The 3rd quarter income level					.918	.931	.929	.879	.863
The 4th quarter income level					.540*	.559*	.555*	.538*	.487*
Living arrangement									
Number of parents/in-laws living in the household						.834†	.832†	.837†	.875
Number of unmarried children living in the household							.941	.925	.958
Health Behavior									
Non- or mild- drinkers								.291**	.288*
Non- or mild- smokers								.460†	1.193
Health Conditions									
Chronic Diseases									2.481***
Life affected by illness within two weeks									10.732***
-2LL	1114.737	1113.655	1112.133	1108.033	1096.197	1093.240	1092.824	1080.616	848.231

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

heavy smoking are significantly associated with a lower risk of poor health among young women. Comparing Model 9 with Model 8, we find the effects of higher family income and non-heavy drinking on self-rated health remain significant. Model 9 also shows that, compared to chronic disease, recent illness is a much stronger predictor of poor self-rated health. No significant interaction effects are found for young women.

Table 4.40 presents the odds ratios of poor self-rated health among Taiwanese men aged 18 to 44. In Model 8, we find that young men with an educational level higher than high school are less likely to report poor health than those who do not. However, the effects of education on self-rated health seem not to be linear. The odds ratios across models show that young men with only a high school degree appear to be a bit healthier than those with a junior college or higher degree. In Model 3 through Model 5, we see the association between education and self-rated health is partly mediated through employment and family income. In Model 8, the three types of employment are not found to be significantly associated with self-rated health. Higher family income, however, is significantly associated with a lower risk of poor health. Model 8 also shows that, unlike young women, living with parents/in-laws is not significantly associated with better health for young men. In addition, comparing the directions of odds ratios regarding marital status for young men and young women (in Model 8 of both Tables), it seems that being married is associated with better health for young women, but not for young men.

Model 10 and Model 11 in Table 4.40 present four significant interaction effects on self-rated health among young men. (1) The significance of "married-by-self employment" (Model 10) suggests that, among married young men, the self-employed are about 85.7% less likely than the non-employed to evaluate their health as poor (odds ratio = 1.446 * 0.099 = 0.143). Among self-employed young men, being married is associated with a 10% greater likelihood of reporting poor health (odds ratio = 11.108 *

Table 4.40. Odds Ratio for Poor Self-rated Health among Taiwanese Men Aged 18 to 44, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Age	1.021[m]	1.013	1.007	1.012	1.009	1.006	1.005	1.004	1.012	1.004	1.002
Educational attainment			.								
High school		.576*	.571*	.548*	.591*	.594*	.596*	.612†	.610†	.597†	.562*
Junior college or above		.629†	.626†	.564*	.639†	.637†	.640†	.717	.716	.740	.680
Marital Status											
Married			1.145	1.213	1.218	1.184	1.151	1.180	1.183	11.108**	1.154
Employment status											
Self employed				.493†	.578	.569	.565	.546	.859	1.446	1.793
Non-familial employment				.931	1.084	1.060	1.058	1.027	1.425	2.707*	1.847[m]
Familial employment				.000	.000	.000	.000	.000	.000	.000	.000
Monthly family income											
Missing category					.505	.520	.521	.512	.695	.579	.648
The 2nd quarter income level					.532*	.533*	.532*	.540*	.505*	.551†	.551†
The 3rd quarter income level					.562†	.567†	.566†	.583†	.533†	.554†	.568[m]
The 4th quarter income level					.666	.681	.683	.686	.795	.830	.845
Living arrangement											
Number of parents/in-laws living in the household						.934	.934	.935	.933	.885	.912
Number of unmarried children living in the household							1.022	1.018	1.026	1.052	2.074*
Health Behavior											
Non- or mild- drinkers								1.189	1.474	1.460	1.457
Non- or mild- smokers								.707	.661[m]	.723	.697
Health Conditions											
Chronic Diseases									1.729†	1.860*	1.866*
Life affected by illness within two weeks									12.862***	13.649***	13.229***
Interaction effects											
Married x self employment										.099*	
Married x non-familial employment										.075***	
Married x familial employment										.039	
Unmarried children living in the household x self-employment											.387*
Unmarried children living in the household x non-familial employment											.504*
Unmarried children living in the household x familial employment											.342
-2LL	776.651	770.778	770.479	750.031	743.684	743.403	743.374	741.053	600.861	588.485	594.947

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

0.099 = 1.100). (2) The significance of "married-by-non-familial employment" (Model 10) immplies that, among married young men, the non-familial employed are about 80% less likely than the non-employed to report poor health (odds ratio = 2.707 * 0.075 = 0.203). For non-familial employed young men, being married is associated with a 16.7% lower risk of poor health (odds ratio = 11.108 * 0.075 = 0.833). (3) The significance of "number of unmarried children living in the household-by-self-employment" (Model 11) indicates that, among young men with unmarried children living in the household, those who are self-employed are about 30% less likely than those who are not employed to report poor health (odds ratio = 1.793 * 0.387 = 0.694). For self-employed young men, adding an unmarried child to the household is associated with about a 20% smaller chance of reporting poor health (odds ratio = 2.074 * 0.387 = 0.803). (4) The significance of "number of unmarried children living in the household-by-non-familial employment" (Model 11) implies that, among young men with unmarried children living in the household, those who are non-familial employed are about 7% less likely than those who are not employed to report poor health (odds ratio = 1.847 * 0.504 = 0.931). For non-familial employed young men, adding an unmarried child to the household is associated with a 4.5% greater likelihood of reporting poor health (odds ratio = 2.074 * 0.504 = 1.045). Overall, the results of Table 4.40 demonstrate that, with chronic diseases and recent illness controlled, multiple roles seem to be unlikely to produce substantial detrimental health effects.

Table 4.39 and Table 4.40 show that the self-rated health status of young men and young women are associated with different sets of social factors. For young women, higher family income, one or more parents/in-laws living in the household, non-heavy drinking, and non-heavy smoking are significant protective factors against poor self-rated health (Model 8 in Table 4.39). For young men, significant protective factors for health

are higher education and higher family income (Model 8 in Table 4.40). For both young men and young women, as one would expect, chronic disease and recent illness are highly significant predictors of poor self-rated health.

c. Gender Differences in Self-rated Health among the Middle Aged

Table 4.41 presents odds ratios for differences in self-rated health for Taiwanese adults aged 45 to 64. Model 1 shows that, with age adjusted, middle-aged men are 47.8% less likely than middle-aged women to evaluate their health as poor. Controlling for education in Model 2 decreases gender differences in health relatively by 18.2%. With employment controlled in Model 4, the gender gap further reduces relatively by 16.5%. This suggests that gender stratification in education and employment contribute to gender differences in self-rated health among middle-aged individuals. Surprisingly, comparing Model 9 (in which chronic disease and recent illness are controlled), although the gender differences become insignificant, the values of odds ratio regarding gender effect in health hardly changes. This is probably because there is no significant gender difference in chronic disease among the middle-aged people (as shown in Table 4.13).

From Model 8, we see that, net of other effects, higher education and higher family income are significantly associated with a smaller chance of reporting poor health. The three types of employment do not show significant effects on self-rated health in Model 8. Note that the odds of poor health for familial employed individuals relative to non-employed individuals is substantially greater than 1.0. Thus, while familial employment is beneficial to young adults' health (shown in Table 4.38), it is likely to be associated with a higher risk of poor health for the middle-aged people. Comparing Model 9 with Model 8, we see that, when chronic diseases and recent illness are controlled, the effects of education and family income on self-rated health remain

Table 4.41. Odds Ratio for Poor Self-rated Health among Taiwanese Adults Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Male	.522***	.609**	.622**	.701*	.650*	.653*	.660*	.713†	.720	.701	.727
Age	1.046***	1.030*	1.028*	1.021	1.014	1.013	1.010	1.009	1.002	.996	1.001
Educational attainment											
High school		.519	.515	.522	.609†	.608†	.602†	.602†	.611[m]	.639	.608[m]
Junior college or above		.272***	.274***	.292***	.382**	.381**	.375**	.374**	.433*	.425*	.445*
Marital Status											
Married			.673*	.656*	.769	.770	.782	.776	.815	.570†	.795
Employment status											
Self employed				.733	.770	.771	.769	.767	.819	.959	.798
Non-familial employment				.725	.798	.799	.794	.793	.987	.298*	.823
Familial employment				1.203	1.196	1.195	1.192	1.198	1.164	.249	1.502
Monthly family income											
Missing category					.717	.715	.727	.729	1.002	1.001	1.072
The 2nd quarter income level					.456***	.456***	.465***	.464***	.541*	.543*	.563*
The 3rd quarter income level					.392***	.391***	.400***	.398***	.434**	.406**	.453**
The 4th quarter income level					.384***	.385***	.394**	.391**	.374**	.344**	.379**
Living arrangement											
Number of parents/in-laws living in the household						.955	.955	.950	1.163	1.183	1.190
Number of unmarried children living in the household							.954	.953	.957	.949	.954
Number of married children living in the household							.974	.979	1.000	1.028	.961
Health Behavior											
Non- or mild- drinkers								1.159	1.342	1.324	1.297
Non- or mild- smokers								1.214	.941	.912	.944
Health Conditions											
Chronic Diseases									2.018***	1.994***	1.950***
Life affected by illness within two weeks									10.603***	11.436***	10.805***
Interaction effects											
Married x self employment										.864	
Married x non-familial employment										4.476*	
Married x familial employment										5.286	
Married children living in the household x self-employment											1.036
Married children living in the household x non-familial employment											2.017†
Married children living in the household x familial employment											.452
-2LL	1094.299	1070.765	1066.895	1062.322	1035.028	1034.971	1034.559	1033.842	806.869	799.408	801.769

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

significant. Model 9 also shows that, compared to chronic disease, recent illness is a much stronger predictor of self-rated health.

Model 10 and Model 11 in Table 4.41 show two significant interactions on self-rated health among middle-aged people. First, the significance of "married-by-non-familial employment" (Model 10) suggests that, for married, middle-aged individuals, the non-familial employed are 33.4% more likely than the non-employed to report poorer health (odds ratio = 0.298 * 4.476 = 1.334). For non-familial employed middle-aged individuals, being married is associated with a much greater chance of reporting poor health (odds ratio = 0.570 * 4.476 = 2.551). Second, the significance of "number of married children living in the household-by-non-familial employment" (Model 11) suggests that, among middle-aged people with married children in the household, those who are non-familial employed are 66.0% more likely than those who are not employed to report poor health (odds ratio = 0.823 * 2.017 = 1.660). Also, for non-familial employed middle-aged individuals, having a married child in the household is associated with a 93.8% higher risk of reporting poor health (odds ratio = 0.961 * 2.017 = 1.938). These results support the role strain hypothesis. That is, with chronic disease and recent illness controlled, multiple roles are associated with a greater likelihood of poorer health for middle-aged people.

Table 4.42 presents odds ratios of poor self-rated health among Taiwanese women aged 45 to 64. Looking at Model 8, we see the odds of poor health for individuals with the two higher levels of education relative to those with the lowest level are both less than 1.0, but these effects are not significant. However, note that from Model 2 to Model 6, a junior college or higher degree is significantly associated with a lower risk of poor health. Thus, it is likely that higher education produces substantial health protective effects for middle-aged women. As we see, the value of odds ratios regarding the two higher levels

Table 4.42. Odds Ratio for Poor Self-rated Health among Taiwanese Women Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.046**	1.035*	1.032†	1.030†	1.019	1.018	1.003	1.001	1.000
Educational attainment									
High school		.593	.592	.586	.673	.673	.693	.734	.806
Junior college or above		.317*	.318*	.324*	.420†	.419†	.434[m]	.451	.552
Marital Status									
Married			.692	.665†	.818	.821	.828	.807	.904
Employment status									
Self employed				.799	.753	.751	.759	.761	.822
Non-familial employment				.941	.963	.965	.953	.977	1.090
Familial employment				1.302	1.194	1.192	1.214	1.214	1.105
Monthly family income									
Missing category					.807	.805	.813	.803	1.061
The 2nd quarter income level					.323***	.323***	.332***	.330***	.331**
The 3rd quarter income level					.395**	.394**	.407**	.401**	.400**
The 4th quarter income level					.358**	.359**	.361**	.349**	.284**
Living arrangement									
Number of parents/in-laws living in the household						.958	.974	.961	1.214
Number of unmarried children living in the household							.874	.868	.897
Number of married children living in the household							1.069	1.071	1.052
Health Behavior									
Non- or mild- drinkers								1.278	1.201
Non- or mild- smokers								6×10^{8}	2.4×10^{9}
Health Conditions									
Chronic Diseases									1.593†
Life affected by illness within two weeks									12.492***
-2LL	658.118	649.396	647.129	645.656	621.377	621.353	618.912	616.688	472.328

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

of education increase substantially from Model 4 to Model 5, in which family income is controlled. Thus, the association between education and self-rated health is likely to be mediated through family income. The three types of employment are not significantly associated with self-rated health in Model 8. It is notable that the odds for familial employment relative to non-employment is consistently larger than 1.0 from Model 2 through Model 8. We find the directions of the association between familial employment and health are opposite for young women (shown in Table 4.39) and for middle-aged women. Although these two associations are not statistically significant, considering the small sample size of familial employment in both groups (96 for young women and 62 for middle-aged women), these two sets of odds ratios may still have substantial meaning. The implication is that, while familial employment is beneficial to young women's health, it is associated with a higher risk of poor health for middle-aged women. Model 8 demonstrates that higher family income is associated with a lower risk of poor health. Also noteworthy is the finding that, unlike young women, living with parents/in-laws is not associated with reporting poor health for middle aged women (Model 8). As I discussed before, this is probably because middle-aged women have to take care of elderly parents/in-laws, rather than receiving assistance from them. Comparing Model 9 to Model 8, we see the protective effects of higher family income on self-rated health remain significant. No significant interaction effects are found for middle-aged women.

Table 4.43 presents the odds ratios for poor self-rated health among Taiwanese men aged 45 to 64. In Model 8, we see that higher educational attainment is significantly associated with a lower risk of reporting poor health. The odds ratios regarding education increase substantially between Model 4 and Model 5; thus we know part of the beneficial effects of education on self-rated health are mediated through family income. Model 8 also shows that non-familial employment and higher family income are both significantly

Table 4.43. Odds Ratio for Poor Self-rated Health among Taiwanese Men Aged 45 to 64, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.046*	1.021	1.020	1.002	1.005	1.005	1.017	1.016	1.000
Educational attainment									
High school		.442*	.437*	.430*	.509†	.508†	.490†	.488†	.406*
Junior college or above		.233**	.236**	.265**	.347*	.346*	.331*	.330*	.352†
Marital Status									
Married			.639	.692	.766	.759	.734	.722	.621
Employment status									
Self employed				.569†	.627	.631	.638	.639	.714
Non-familial employment				.440*	.526†	.528†	.512†	.510†	.770
Familial employment				.896	.965	.967	1.007	1.024	.981
Monthly family income									
Missing category					.349	.349	.377	.384	.717
The 2nd quarter income level					.816	.815	.846	.842	1.129
The 3rd quarter income level					.387*	.385*	.403*	.397*	.452†
The 4th quarter income level					.464†	.464†	.499[m]	.492[m]	.587
Living arrangement									
Number of parents/in-laws living in the household						.949	.960	.954	1.109
Number of unmarried children living in the household							1.059	1.060	1.031
Number of married children living in the household							.746	.755	.905
Health Behavior									
Non- or mild- drinkers								1.083	1.337
Non- or mild- smokers								1.154	.891
Health Conditions									
Chronic Diseases									3.190***
Life affected by illness within two weeks									7.922***
-2LL	436.181	420.781	419.171	412.985	404.484	404.448	402.642	402.320	319.190

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

associated with a lower risk of poor health among middle-aged men. Comparing Model 9 to Model 8, we find the beneficial effect of education on self-rated health remain significant even with chronic disease and recent illness controlled. No significant interactions are found for middle-aged men.

Table 4.42 and Table 4.43 show that middle-aged women and men share similar risk factors for self-rated health. Higher educational attainment and higher family income are associated with a lower risk of poor health for both middle-aged women and men. For middle-aged men, the additional significant protective factor for self-rated health is non-familial employment.

d. Gender Differences in Self-rated Health among the Elderly

Table 4.44 presents the odds ratios for poor self-rated health among people aged 65 or above. Model 1 shows that, with age adjusted, elderly men are 46.4% less likely than elderly women to report poor health. Controlling for educational attainment in Model 2 and marital status in Model 3 substantially reduces this gender gap relatively by 24.1% and 12.5%, respectively. Controlling for chronic disease and recent illness in Model 9 makes the gender differences become statistically insignificant, but the odds ratio regarding the magnitude of gender gap hardly changes.

In Model 8, net of other effects, a junior high school education or above is significantly associated with a lower risk of reporting poor health for elderly people. Part of the association between education and self-rated health is explained by family income (see the change of educational effects between Model 4 and Model 5). With chronic diseases and recent illness are controlled in Model 9, we find that the detrimental effect of age on health, as well as the health protective effects of higher family income, become significant. Model 9 shows that, while recent illness is still the strongest predictor of self-

Table 4.44. Odds Ratio for Poor Self-rated Health among Taiwanese Adults Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Male	.536**	.648*	.706[m]	.734	.678†	.677†	.673†	.633†	.638	.614[m]
Age	1.032†	1.028	1.020	1.020	1.021	1.021	1.021	1.024	1.041†	1.042†
Educational attainment										
Elementary school		.750	.773	.784	.827	.826	.823	.824	.717	.723
Junior high school or above		.462*	.473*	.469*	.553†	.552†	.545†	.564†	.630	.638
Marital Status										
Married			.712	.709	.722	.722	.724	.737	.997	.964
Employment status										
Self employed				.708	.716	.719	.726	.706	1.129	.487
Non-familial employment				1.000	.964	.963	.954	.961	1.533	.764
Familial employment				1.256	1.252	1.252	1.262	1.268	1.836	1.833
Monthly family income										
Missing category					.595	.593	.619	.610	.471†	.485[m]
The 2nd quarter income level					.923	.920	.936	.932	.671	.712
The 3rd quarter income level					.717	.715	.745	.737	.523†	.530†
The 4th quarter income level					.567†	.565†	.597	.601	.478†	.447†
Living arrangement										
Number of unmarried children living in the household						1.016	1.002	.998	1.049	1.032
Number of married children living in the household							.941	.940	.946	.876
Health Behavior										
Nondrinkers								1.046	.650	.608
Non- or mild- smokers								.699	.787	.805
Health Conditions										
Chronic Diseases									1.506[m]	1.533[m]
Life affected by illness within two weeks									12.111***	11.945***
Interaction effects										
Married children living in the household x self-employment										3.018†
Married children living in the household x non-familial employment										4.954
Married children living in the household x familial employment										1.038
-2LL	611.290	604.973	602.493	601.241	596.539	596.532	596.412	595.441	454.408	450.237

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

rated health, the effect of chronic disease on self-rated health becomes smaller (compared to that in other age groups) and at the marginal level of significance ($0.10 < p < 0.12$).

Model 10 in Table 4.44 shows the significant interaction of self-rated health found among elderly people. The significance of "number of married children living in the household-by-self-employment" suggests that, among elderly people living with married children, those who are self-employed are 47% more likely than those who are not employed to report poor health (odds ratio = 0.487 * 3.018 = 1.470). Also, for self-employed elders, having a married child in the household is associated with a much greater chance of reporting poor health (odds ratio = 0.876 * 3.018 = 2.644). This could be because ill elders tend to move in with married children. Also, as discussed before (on page 120), working could be an extra burden for elderly people who live with married children.

Table 4.45 presents the odds ratios of poor self-rated health for elderly women. Probably due to the small sample size, no covariates are found significantly associated with self-rated health for elderly women in Model 8. When chronic disease and recent illness are controlled in Model 9, the detrimental effects of aging on health become significant. Model 9 also shows that, while recent illness is still a strong predictor of self-rated health, the effect of chronic disease on self-rated health becomes insignificant.

Table 4.46 shows the odds ratios for poor self-rated health among Taiwanese men aged 65 or over. Looking at Model 2 through Model 4, we find that, before family income is controlled in Model 5, higher educational attainment is associated with a lower risk of poor health. This suggests that the impact of education on health is partly mediated through family income. Model 8 suggests that, at the marginal level of significance ($0.10 < p < 0.12$), being married is associated with a lower risk of poor health. Comparing Model 9 with Model 8, we find the protective effects of family income

Table 4.45. Odds Ratio for Poor Self-rated Health among Taiwanese Women Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.041†	1.035	1.032	1.031	1.032	1.030	1.029	1.031	1.056†
Educational attainment									
Elementary school		.799	.808	.796	.823	.831	.826	.828	.766
Junior high school or above		.441	.442	.448	.545	.550	.540	.539	.832
Marital Status									
Married			.891	.870	.865	.864	.867	.872	1.137
Employment status									
Self employed				.830	.806	.787	.802	.820	1.342
Non-familial employment				.619	.511	.515	.490	.514	1.134
Familial employment				1.406	1.404	1.429	1.427	1.463	1.888
Monthly family income									
Missing category					.736	.751	.824	.831	.675
The 2nd quarter income level					1.197	1.219	1.280	1.233	.893
The 3rd quarter income level					.911	.920	1.016	1.025	.732
The 4th quarter income level					.558	.568	.641	.637	.494
Living arrangement									
Number of unmarried children living in the household						.882	.849	.846	.830
Number of married children living in the household							.883	.876	.826
Health Behavior									
Nondrinkers								.651	.582
Non- or mild- smokers								.657	.716
Health Conditions									
Chronic Diseases									1.458
Life affected by illness within two weeks									11.135***
-2LL	325.286	322.945	322.755	322.050	318.921	318.740	318.477	317.929	246.012

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table 4.46. Odds Ratio for Poor Self-rated Health among Taiwanese Men Aged 65 or over, 2000-2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Age	1.021	1.017	1.003	1.005	1.004	1.005	1.005	1.009	1.017
Educational attainment									
Elementary school		.691	.734	.739	.794	.799	.798	.786	.661
Junior high school or above		.458†	.482†	.467†	.568	.571	.568	.585	.590
Marital Status									
Married			.521*	.518*	.552†	.543†	.543†	.572[m]	.764
Employment status									
Self employed				.714	.737	.768	.772	.745	1.063
Non-familial employment				1.473	1.453	1.445	1.445	1.439	1.819
Familial employment				1.145	1.178	1.206	1.212	1.190	1.728
Monthly family income									
Missing category					.301	.293	.297	.280	.125†
The 2nd quarter income level					.725	.700	.702	.711	.506
The 3rd quarter income level					.570	.551	.556	.549	.345†
The 4th quarter income level					.565	.528	.536	.552	.395
Living arrangement									
Number of unmarried children living in the household						1.140	1.137	1.120	1.292
Number of married children living in the household							.982	.980	1.234
Health Behavior									
Nondrinkers								1.139	.597
Non- or mild- smokers								.740	.807
Health Conditions									
Chronic Diseases									1.677
Life affected by illness within two weeks									13.662***
-2LL	285.680	281.710	277.882	276.712	273.367	273.106	273.102	272.443	202.791

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

on self-rated health become significant. Also, the effect of chronic disease on self-rated health is insignificant, but recent illness is still a strong predictor of poor self-rated health.

Comparing Table 4.45 and Table 4.46, we find that the protective effects of educational attainment and marriage on self-rated health are more evident among elderly men. In addition, compared to chronic disease, recent illness is a much stronger predictor of poor self-rated health for both elderly women and men.

C. Summary

The magnitude of gender differences in self-rated health appears to be relatively stable across the three age groups. Men in general are about 48% less likely than women to evaluate their own health as in a poor state. In each age group, different sets of social factors are found to account for gender differences in self-rated health. For young adults, risky health behaviors explain most of the gender differentials in self-rated health. For middle-aged people, the gender gap in health is partly explained by educational attainment and employment. For elderly people, gender differences in health are more likely to be explained by educational attainment and marital status.

The protective factors for self-rated health are different for men than for women. For women, health is more determined by health behaviors and living arrangements with children or parents/in-laws. For men, health is more likely to be determined by educational attainment and employment.

Higher educational attainment in general is associated with a lower risk of reporting poor health, especially among the middle-aged and elderly group. The impacts of education on self-rated health seem to accumulate with age and become evident after middle age. In addition, the effects of types of employment on health vary with age. For instance, familial employment is associated with better health for young adults, but not for middle-aged and elderly people. This pattern is very apparent among women. The

health protective effects of non-familial employment, on the other hand, are more evident among middle-aged men. Regarding family role factors, the health benefits associated with marriage are more evident among elderly people, especially for elderly men. In addition, living with parents entails health benefits for young women. However, this beneficial effect fades when women enter middle age. Finally, probably due to the controls of chronic disease and recent illness, detrimental health effects regarding multiple roles are rarely found. On most occasions, the combinations of paid work and family roles exhibit beneficial effects on self-rated health. The results suggest that the effect of combining working roles and family roles on health varies according to different stages of the life course.

CHAPTER 5: RESULTS FROM THE SUPPLEMENTARY DATA SET

1. GENDER DIFFERENCES IN SOCIAL CHARACTERISTICS AND HEALTH CONDITIONS

A. Overall Differences

Table 5.1 presents the distribution of sociodemographic and psychosocial factors for employed men and women in Taiwan. It shows that the average age of employed women is significantly lower than that of men since women are more likely to withdraw from the labor market after they are married or have children. There are no significant differences in educational attainment between employed men and women. Regarding types of employment, more men than women are self-employed. Women are more likely than men to work for non-family businesses or family firms. Regarding working hours, employed men on average work about three more hours than employed women per week. Employed men have significantly higher personal income than employed women, but there is no significant difference in family income between these two populations. As to psychosocial factors, employed women on average report a higher degree of role-strain than employed men. As expected, men on average exercise more often then women. In general, employed women are more likely than employed men to report their life affected by illness within the last two weeks.

B. Differences among age groups

Tables 5.2 to 5.4 show the distributions of sociodemographic and psychosocial factors for employed men and women in three age groups. Gender differences in types of employment are evident among young adults and middle-aged people, but not for the elderly. Among the young adults, while men are more likely than women to be self-

Table 5.1. Weighted Distribution of Social and Health Factors for Employed Taiwanese in 2002

Variables	Men	Women	Total
Age (mean)	40.68	37.46*	39.29
Family role factors			
Married (%)	70.53	67.36	69.17
Number of unmarried children living together	1.18	1.26	1.22
Educational attainment (%)			
Junior high school or below	36.67	32.47	34.86
High school	33.38	35.54	34.31
Junior college or above	29.95	31.99	30.83
Employment status (%)			
Self-employed	28.30	15.94*	22.90
Non-familial employment	66.26	75.35*	70.17
Familial employment	5.44	8.71*	6.84
Working hours per week (mean)	49.17	45.97*	47.79
Monthly income (NTD)			
Personal income (mean)	40,000	29,000*	35,000
Family income (mean)	72,000	77,000	7,4000
Role strain index[a] (mean)	1.71	1.89*	1.78
Frequency of exercise per week (mean)	2.46	1.90*	2.22
Health Status			
Life affected by illness in the past 2 weeks (%)	29.26	37.25*	32.69
N	687	517	1204[12]

Source: TSCS 4.3 Q2

† p< .10; * p<.05 (t-test for gender difference)

a. The scale ranges from 1 to 4.

[12] Unweighted n=1167; 662 men and 505 women.

Table 5.2. Weighted Distribution of Social and Health Factors for Employed Taiwanese for People Aged 18 to 44 in 2002

Variables	Men	Women	Total
Age (mean)	32.96	32.61	32.79
Family role factors			
Married (%)	60.34	61.28	60.78
Number of unmarried children living together	1.36	1.47	1.41
Educational attainment (%)			
Junior high school or below	24.17	21.52	22.94
High school	39.27	40.71	39.94
Junior college or above	36.56	37.77	37.12
Employment status (%)			
Self-employed	17.65	11.14*	14.63
Non-familial employment	75.62	81.05†	78.13
Familial employment	6.73	7.82	7.23
Working hours per week (mean)	48.63	45.41*	47.13
Monthly income (NTD)			
Personal income (mean)	41,000	30,000*	36,000
Family income (mean)	77,000	81,000	79,000
Role strain index[a] (mean)	1.83	1.91	1.86
Frequency of exercise per week (mean)	2.14	1.59*	1.89
Health Status			
Life affected by illness in the past 2 weeks (%)	30.50	39.71†	34.77
N	443	383	826[13]

Source: TSCS 4.3 Q2

† p< .10; * p<.05 (t-test for gender difference)

a. The scale ranges from 1 to 4.

[13] Unweighted n=762; 398 men and 364 women

Table 5.3. Weighted Distribution of Social and Health Factors for Employed Taiwanese for People Aged 45 to 64 in 2002

Variables	Men	Women	Total
Age (mean)	51.82	50.39*	51.24
Family role factors			
Married (%)	89.89	83.97	87.62
Number of unmarried children living together	0.83	0.67	.077
Educational attainment (%)			
Junior high school or below	55.50	62.60	58.22
High school	25.39	21.15	23.77
Junior college or above	19.11	16.25	18.01
Employment status (%)			
Self-employed	44.57	27.81*	38.15
Non-familial employment	53.58	61.26	56.52
Familial employment	1.85	10.93*	5.33
Working hours per week (mean)	50.11	47.35	49.04
Monthly income (NTD)			
Personal income (mean)	41,000	26,000*	36,000
Family income (mean)	67,000	67,000	67,000
Role strain index[a] (mean)	1.48	1.83*	1.62
Frequency of exercise per week (mean)	2.90	2.65	2.81
Health Status			
Life affected by illness in the past 2 weeks (%)	26.05	30.78	27.86
N	207	128	335[14]

Source: TSCS 4.3 Q2

† p< .10; * p<.05 (t-test for gender difference)

a. The scale ranges from 1 to 4.

[14] Unweighted n=360; 225 men and 135 women.

Table 5.4. Weighted Distribution of Social and Health Factors for Employed Taiwanese for People Aged 65 or over in 2002

Variables	Men	Women	Total
Age (mean)	71.89	70.03	71.62
Family role factors			
Married (%)	84.32	100.00	86.58
Number of unmarried children living together	0.97	0.19	0.86
Educational attainment (%)			
No formal education	31.68	53.65	34.85
Elementary School	48.80	32.92	46.51
Junior high school or above	19.52	13.43	18.64
Employment status (%)			
Self-employed	66.84	68.31	67.05
Non-familial employment	22.95	13.81	21.63
Familial employment	10.21	17.88	11.31
Working hours per week (mean)	51.72	52.64	51.86
Monthly income (NTD)			
Personal income (mean)	17,000	6,000	16,000
Family income (mean)	38,000	24,000	36,000
Role strain index[a] (mean)	1.52	1.75	1.56
Frequency of exercise per week (mean)	3.41	3.78	3.47
Health Status			
Life affected by illness in the past 2 weeks (%)	33.07	19.11	31.06
N	36	6	42[15]

Source: TSCS 4.3 Q2

† p< .10; * p<.05 (t-test for gender difference)

a. The scale ranges from 1 to 4.

[15] Unweighted n=44; 38 men and 6 women

employed, women are more likely than men to work for non-familial business. There is no significant difference between young men and young women in the proportion of working for a familial business (Table 5.2). For middle-aged people, gender differences in the proportion of working for non-familial business become insignificant. Middle-aged men are more likely than middle-aged women to be self-employed, and middle-aged women are more likely than middle-aged men to work for family firms (Table 5.3). Compared to young men, the proportion of middle-aged men who are self-employed increases from 17.65% to 44.57%. Compared to young women, the proportion of middle-aged women working for family business increases from 7.82% to 10.93% (see Table 5.2 and Table 5.3). The gender difference in working hours is significant among young adults, but not for the middle-aged and elderly groups. Table 5.4 shows that employed women on average work longer hours per week than employed men (but the difference is not statistically significant). The gender gap in personal income is significant among young adults and middle-aged people, and this gap is larger for middle-aged men and women. Among the three age groups, gender differences in role strain are only significant in the middle-aged group. Middle-aged employed women are more likely than middle-aged employed men to feel role-strain. Gender differences in frequency of exercise are found only among the young adults. Young employed men tend to exercise more often than young employed women. Finally, gender differences in life affected by recent illness is evident among the young adults, but not among the middle-aged and the elderly. Another noteworthy finding is that, among elderly employed individuals, fewer women (19.11%) than men (33.07%) report recent illness (although the difference is not statistically significant). This reversed pattern may be due to the effect of health selection in the labor market for the elderly. That is, only very healthy elderly women remain in the labor market.

2. FACTORS RELATED TO WORKLOAD AND ROLE CONFLICTS

Table 5.5 presents average working hours per week for employed men and women in different types of employment within each age group. We find that weekly working hours are significantly different among three types of employment for young men, young women, and middle-aged women. For young men, the three types of employment are ordered by the length of weekly working hours as: familial employment (53.51 hours/week), self-employment (51.22 hours/week), and non-familial employment (47.57 hours/week). For young women, the three types of employment are ordered by work hours as: self-employment (58.22 hours/week), non-familial employment (44.22 hours/week), and familial employment (40.05 hours/week). For middle-aged women, the order is: familial employment (53.97 hours/week), self-employment (51.31 hours/week), and non-familial employment (44.48 hours/week). One noteworthy finding here is that, while young women work relatively shorter hours in family firms than in other types of businesses, middle-aged familial employed women have longer working hours compared to their counterparts in other types of employment.

Table 5.6 presents weighted mean scores for stress due to role strain for men and women in different types of employment within each age group. No statistically significant differences in role strain scores are found among three types of employment in any age-by-sex group. As expected, compared to employed women, most employed men tend to report lower scores on role-strain, except for familial employed young and elderly men, and non-familial employed elderly men. Across the three age groups, we find that employed young adults report higher stress due to role-strain than those in the other two age groups. This implies that young adults are more likely than the middle-aged and elderly people to experience the conflict between paid work and family roles.

Table 5.5. Weighted Means of Average Working Hours Per Week for Employed Taiwanese by Gender, Age, and Types of Employment

	Men	Women	Total
Age 18 – 44			
Self-employment	51.22*	58.22*	53.65*
Non-familial employment	47.57*	44.22*	45.95*
Familial employment	53.51*	40.05*	46.76*
Age 45 – 64			
Self-employment	53.56	51.31*	52.93*
Non-familial employment	47.37	44.48*	46.16*
Familial employment	47.76	53.97*	52.55*
Age 65 or over			
Self-employment	51.10	57.31	52.12
Non-familial employment	50.87	20.00	48.03
Familial employment	57.18	60.00	57.83

† p< .10; * p<.05 (One-way ANOVA)

Table 5.6. Weighted Mean of Stress of Role-Strain for Employed Taiwanese by Gender, Age, and Types of Employment

	Men	Women	Total
Age 18 – 44			
Self-employment	1.74	1.94	1.81
Non-familial employment	1.84	1.91	1.88
Familial employment	1.85	1.83	1.84
Age 45 – 64			
Self-employment	1.41	1.89	1.55
Non-familial employment	1.54	1.81	1.65
Familial employment	1.42	1.82	1.73
Age 65 or over			
Self-employment	1.52	1.99	1.59
Non-familial employment	1.73	1.50	1.71
Familial employment	1.12	1.00	1.09

† p< .10; * p<.05 (One-way ANOVA)

3. LIFE AFFECTED BY ILLNESS IN THE PAST TWO WEEKS

A. Descriptive Analyses

Table 5.7 presents proportions with life affected by illness within the past two weeks for Taiwanese employed individuals with different social or behavioral characteristics. According to the table, employed women are in general more likely than employed men to report their life affected by illness in the past two weeks. For both men and women, individuals in different types of employment do not display significantly different likelihood of reporting recent illness. Among the social and behavioral factors listed, people with different levels of weekly working hours, role strain, and frequency of exercise appear to have different chances of reporting recent illness. Among people who work for different lengths of time per week, individuals who work 40 hours per week are least likely to report recent illness (19.5%). The proportion who report recent illness for those who work less than 40 hours, 41 to 50 hours, and more than 50 hours are 21.8%, 21.9%, and 27.7%, respectively. The implication is that individuals who are sick have to miss work. For both men and women, experiencing a higher degree of role strain is significantly associated with a higher risk of reporting recent illness. Lastly, among the employed women, those who exercise one to three times a week are most likely to report their life affected by recent illness. One possible explanation is that these women try to use exercise to relieve their ailments. It may be that women who work out less than once a week are in relatively better health and do not feel the necessity to engage in physical exercise.

Table 5.8 to Table 5.10 present proportions with life affected by illness within two weeks for Taiwanese employed individuals with different characteristics and in different age groups. There are no significant associations found between types of employment and

Table 5.7. Weighted Proportion with Life Affected by Illness in the Past Two Weeks by Gender for Employed Taiwanese Adults, 2002.

	Total	Men	Women
Types of employment			
Self employed	.231	.183	.271
Non-familial employment	.233	.221	.247
Familial employment	.215	.191	.236
Educational attainment			
Junior high school or below	.231	.202	.274
High school	.201	.178	.231
Junior college or above	.249	.251	.246
Marital status			
Not-married	.243	.213	.278
Married	.219	.207	.236
Number of unmarried children living in the household			
None	.214	.199	.237
One	.239	.198	.287
Two	.263	.250	.279
Three or more	.184	.187	.180
Number of parents/in laws living in the household			
None	.229	.207	.257
One	.233	.224	.245
Two	.218	.203	.239
Monthly family income			
The 1st quarter income level	.223	.215	.237
The 2nd quarter income level	.270	.224	.332
The 3rd quarter income level	.196	.172	.222
The 4th quarter income level	.217	.225	.205
Working hours per week			
1 to 39 hours	.218†	.202	.235
40 hours	.195†	.175	.216
41 to 50 hours	.219†	.194	.251
51 hours or more	.277†	.259	.311
Role strain index			
1 to 2	.169*	.150*	.200*
2 to 3	.258*	.253*	.263*
3 to 4	.412*	.428*	.395*
Frequency of weekly exercise			
Less than once a week	.198†	.197	.199*
One to three times a week	.218†	.182	.270*
Four to seven times a week	.202†	.196	.216*

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

Table 5.8. Weighted Proportion with Life Affected by Illness in the Past Two Weeks by Gender for Employed Taiwanese Adults Aged 18 to 44, 2002.

	Total	Men	Women
Types of employment			
Self employed	.259	.232	.310
Non-familial employment	.241	.231	.253
Familial employment	.199	.147	.251
Educational attainment			
Junior high school or below	.269	.203	.357*
High school	.213	.201	.227*
Junior college or above	.253	.266	.239*
Marital status			
Not-married	.254	.225	.287
Married	.233	.225	.242
Number of unmarried children living in the household			
None	.232	.207	.271
One	.272	.240	.303
Two	.265	.268	.262
Three or more	.184	.181	.187
Number of parents/in laws living in the household			
None	.243	.218	.267
One	.284	.282	.286
Two	.221	.208	.238
Monthly family income			
The 1st quarter income level	.239	.204	.281
The 2nd quarter income level	.224	.192	.259
The 3rd quarter income level	.199	.169	.225
The 4th quarter income level	.214	.224	.201
Working hours per week			
1 to 39 hours	.260*	.243	.274
40 hours	.197*	.193	.201
41 to 50 hours	.226*	.187	.278
51 hours or more	.309*	.297	.330
Role strain index			
1 to 2	.171*	.148*	.201*
2 to 3	.263*	.257*	.269*
3 to 4	.445*	.458*	.430*
Frequency of weekly exercise			
Less than once a week	.212	.220	.204*
One to three times a week	.217	.186	.259*
Four to seven times a week	.207	.227	.165*

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

Table 5.9. Weighted Proportion with Life Affected by Illness in the Past Two Weeks by Gender for Employed Taiwanese Adults Aged 45 to 64, 2002.

	Total	Men	Women
Types of employment			
Self employed	.157	.131	.225
Non-familial employment	.209	.197	.225
Familial employment	.280	.497	.221
Educational attainment			
Junior high school or below	.203	.210	.192
High school	.138	.074	.262
Junior college or above	.232	.198	.299
Marital status			
Not-married	.170	.128	.213
Married	.196	.178	.226
Number of unmarried children living in the household			
None	.200	.194	.208
One	.146	.122	.189
Two	.234	.156	.391
Three or more	.167	.189	.122
Number of parents/in laws living in the household			
None	.214	.195	.242
One	.089	.073	.115
Two	.171	.145	.256
Monthly family income			
The 1st quarter income level	.204	.245	.108
The 2nd quarter income level	.152	.123	.200
The 3rd quarter income level	.183	.145	.237
The 4th quarter income level	.238	.191	.305
Working hours per week			
1 to 39 hours	.153	.156	.148
40 hours	.188	.134	.274
41 to 50 hours	.178	.186	.169
51 hours or more	.225	.203	.271
Role strain index			
1 to 2	.159*	.144†	.192
2 to 3	.241*	.234†	.247
3 to 4	.337*	.387†	.304
Frequency of weekly exercise			
Less than once a week	.168	.150	.195
One to three times a week	.219	.167	.302
Four to seven times a week	.188	.154	.256

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

Table 5.10. Weighted Proportion with Life Affected by Illness in the Past Two Weeks by Gender for Employed Taiwanese Adults Aged 65 or above, 2002.

	Total	Men	Women
Types of employment			
Self employed	.232	.223	.280
Non-familial employment	.170	.188	.000
Familial employment	.178	.230	.000
Educational attainment			
Junior high school or below	.179	.171*	.221
High school	.551	.719*	.000
Junior college or above	.214	.214*	-
Marital status			
Not-married	.150	.150	-
Married	.222	.228	.191
Number of unmarried children living in the household			
None	.126	.157	.000
One	.263	.131	1.000
Two	.738	.738	-
Three or more	.262	.262	-
Monthly family income			
The 1st quarter income level	.119	.143	.000
The 2nd quarter income level	.342	.419	.000
The 3rd quarter income level	.209	.229	.000
The 4th quarter income level	.201	.087	1.000
Working hours per week			
1 to 39 hours	.123	.167	.000
40 hours	.236	.236	-
41 to 50 hours	.333	.333	-
51 hours or more	.208	.187	.280
Role strain index			
1 to 2	.231	.223	.278
2 to 3	.245	.272	.000
3 to 4	.000	.000	.000
Frequency of weekly exercise			
Less than once a week	.159	.197	.000
One to three times a week	.297	.297	-
Four to seven times a week	.257	.233	.379

Source: TSCS 4.1Q2 and 4.3 Q1

† p< .10; * p<.05 (One-way ANOVA)

recent illness for people in each age group. Effects of educational attainment on recent illness are found among young women and elderly men. For young employed women, those with a junior high school or lower degree are more likely to report their life affected by recent illness (Table 5.8). For elderly employed men, those with a high school degree are most likely to report recent illness (Table 5.10). People who feel a higher degree of role strain are in general more likely to report recent illness. The associations are usually more significant among young and middle-aged women. The effects of weekly exercise on recent illness are significant only among young women. Young women who exercise one to three times per week are more likely to report their life affected by recent illness (Table 5.8).

B. Multivariate Analyses

a. Overall Gender Differences in Life Affected by Illness in the Past Two Weeks

Table 5.11 presents the odds ratios of life affected by illness in the past two weeks for Taiwanese employed individuals. Looking at the full model of main effects (Model 10), we see the effects of self-employment and familial employment on recent illness are not significantly different from those in non-familial employment. No significant effect of gender on recent illness is found. Note that, although the effect of age on recent illness is not significant in Model 10, it is significant from Model 4 through Model 8. Values of those significant odds ratios show that an increase in age is associated with a smaller risk of recent illness. Since the effect of age becomes insignificant when role strain index is controlled in Model 9, it appears that the effect of age on recent illness is mediated through role strain. In Model 10, the odds of recent illness for the two higher levels of education relative to the lowest level are both less than 1.0, but only the one regarding high school degree is statistically significant. That is, among Taiwanese employed

Table 5.11. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Employed Adults, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	.870	.994	1.014	1.015	1.014	1.026	1.039	.982	.987	.971	1.245
Familial employment	.902	.900	.914	.915	.913	.912	.918	.829	.823	.861	1.700
Male		.815	.816	.816	.816	.834	.821	.804	..894	.893	.872
Age		.990[m]	.9868	.986†	.987†	.982*	.982*	.984†	.988	.989	.990
Educational attainment											
High school			.715†	.715†	.715†	.714†	.765	.793	.732[m]	.692†	.687†
Junior college or above			.938	.938	.940	.945	1.087	1.137	.971	.965	.963
Family role factors											
Married				.991	.981	.936	.971	.955	.960	.969	1.092
Number of unmarried children living together					1.009	1.009	.998	1.022	1.019	1.026	1.025
Number of parents/in laws living together						.866	.880	.895	.894	.903	.913
Monthly family income											
The 2nd quarter income level							1.214	1.187	1.273	1.294	1.279
The 3rd quarter income level							.767	.762	.757	.755	.741
The 4th quarter income level							.854	.809	.857	.850	.812
Working hours per week								1.011**	1.008†	1.008†	1.009*
Role strain index									1.875***	1.851***	1.847***
Frequency of exercise per week											
Missing										1.773**	1.734**
1 to 3 times per week										1.120	1.095
4 to 7 times per week										1.164	1.147
Interactions											
Married x self-employed											.719
Married x familial employed											.343†
-2LL	1287.298	1281.869	1277.834	1277.831	1277.813	1275.470	1269.594	1245.941	1199.955	1191.311	1188.195

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

individuals, those with a high school degree (but not a higher degree) are about 30% less likely than those who do not graduate from high school to report recent illness. No significant association is found between family role factors and recent illness in Model 10. Model 10 also shows that, net of other effects, longer hours of employment, higher levels of role-strain, and missing values on weekly exercise are associated with a greater likelihood of reporting recent illness. Model 11 presents a significant interaction effect. The significant interaction involving "married-by-familial employed" indicates that, among married people, those who work for a family business are about 41.7% less likely than those who work for a non-familial business to report life affected by illness in the past two weeks (odds ratio = 1.700 * 0.343 = 0.583). For familial employed individuals, being married is associated with a 62.5% smaller chance of reporting life affected by recent illness. (odds ratio = 1.092 * 0.343 = 0.375). These results suggest that working for family firms might yield more health benefits than working for non-familial firms. Also, marriage is likely to provide social support and social control for familial employed individuals and in turn decrease their risk of reporting recent illness.

Table 5.12 presents odds ratios of life affected by illness in the past two weeks for Taiwanese employed women. Looking at the full model of main effects (Model 10), we see an increase of one year in age is associated with a slightly smaller risk of reporting recent illness. This could be a result of health selection, for healthy women are more apt to remain in the labor market. In Model 10, no significant differences in health are found among individuals in different types of employment. However, the odds ratios for familial employment compared to non-familial employment are almost always less than 1.0 (except in Model 2 and Model 11). On the other hand, the odds for self-employment relative to non-familial employment are consistently greater than 1.0. Considering that the sample size of familial employed women (n = 45) and self-employed women (n = 82)

Table 5.12. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Employed Women, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	1.136	1.301	1.222	1.232	1.215	1.193	1.257	1.153	1.103	1.031	1.732
Familial employment	.939	1.012	.947	.963	.972	.953	.982	.881	.871	.947	5.017†
Age		.982†	.974*	.976*	.974*	.966*	.967*	.968*	.969*	.970*	.972†
Educational attainment											
High school			.621†	.622†	.621†	.617†	.669	.696	.651	.621[m]	.632
Junior college or above			.675	.676	.662	.670	.796	.830	.708	.690	.716
Family role factors											
Married				.904	.951	.883	.915	.911	.921	.976	1.196
Number of unmarried children living together					.952	.942	.929	.936	.914	.917	.925
Number of parents/in laws living together						.801[m]	.817	.814	.812	.823	.838
Monthly family income											
The 2nd quarter income level							1.631*	1.563	1.551	1.567	1.574
The 3rd quarter income level							.951	.980	1.015	.981	.950
The 4th quarter income level							.873	.862	.920	.910	.878
Working hours per week								1.012†	1.008	1.009	1.011
Role strain index									1.644***	1.621**	1.615**
Frequency of exercise per week											
Missing										1.968*	1.871*
1 to 3 times per week										1.449	1.332
4 to 7 times per week										1.179	1.180
Interactions											
Married x self-employed											.489
Married x familial employed											.109*
-2LL	581.426	578.415	575.263	575.088	574.865	572.396	566.851	558.641	545.605	539.780	534.244

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

are both small, statistical insignificance of these odds ratios may well be the consequence of relatively large standard errors. The implication is that familial employed women are less likely than non-familial employed women to report recent illness. Also, self-employed women may be more likely than non-familial employed women to report recent illness. The odds of recent illness for the two higher levels of education relative to the reference category are both less than 1.0, but these effects are not statistically significant. Note that the protective health effect of high school education on health is significant in Model 3 through Model 6 until family income is controlled in Model 7. This indicates that the beneficial health impact of education on health is mediated through higher family income. No significant association between family role factors and recent illness is found. A higher level of role strain and missing values on exercise are associated with a lower risk of recent illness (Model 10). Model 11 presents a significant interaction. The significance of "married-by-familial employed" indicates that, among married women, those working for family firms are 45.3% less likely than those working for non-familial firms to report recent illness (odds ratio = 5.017 * 0.109 = 0.547). Also, for familial employed women, being married is associated with a 58.4% smaller chance of reporting recent illness (odds ratio = 1.196 * 0.109 = 0.416). The implication is that familial employment may yield more health benefits than non-familial employment for married women.

Table 5.13 shows the odds ratios for life affected by illness in the past two weeks for employed men. In the full model of main effects (Model 10), we see the odds of recent illness for self-employment and familial employment relative to non-familial employments are both less than 1.0, but these effects are not significant. The insignificance could be also due to the small sample size of self-employed men (n=196) and familial employed (n=37). Unlike the estimates for women, the magnitude of the two

Table 5.13. Odds Ratio for Life Affected by Illness within Two Weeks, Taiwanese Employed Men, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	.787	.826	.888	.883	.868	.878	.859	.823	.845	.853	.727
Familial employment	.830	.823	.857	.865	.853	.862	.844	.787	.805	.795	1.851
Age		.995	.994	.993	.994	.991	.991	.993	1.000	1.001	1.000
Educational attainment											
High school			.782	.779	.783	.783	.843	.859	.766	.732	.752
Junior college or above			1.195	1.192	1.205	1.204	1.371	1.407	1.184	1.227	1.226
Family role factors											
Married				1.081	1.020	.997	1.026	.981	.994	.971	.976
Number of unmarried children living together					1.056	1.058	1.054	1.091	1.113	1.111	1.109
Number of parents/in laws living together						.927	.948	.977	.979	.980	.969
Monthly family income											
The 2nd quarter income level							.951	.952	1.127	1.148	1.114
The 3rd quarter income level							.630	.608[m]	.556†	.579†	.582†
The 4th quarter income level							.842	.781	.822	.836	.825
Working hours per week								1.011†	1.008	1.008	1.008
Role strain index									2.153***	2.106***	2.122***
Frequency of exercise per week											
Missing										1.504	1.549
1 to 3 times per week										.873	.896
4 to 7 times per week										1.058	1.162
Interactions											
Parents/in-laws living in the household x self-employed											1.307
Parents/in-laws living in the household x familial employed											.365†
-2LL	702.206	701.488	698.334	698.219	697.883	697.535	694.551	679.577	643.897	640.229	634.890

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

sets of odds ratio are similar to each other, which suggests that, for employed men, the effect of self-employment and familial employment on recent illness are similar to each other. In Model 10, educational attainment and family role factors exhibit no significant effects on recent illness. Higher family income (the 3rd quarter income level) is found to be associated with a lower risk of recent illness. Model 10 also shows that a higher degree of role strain is associated with a greater chance of reporting recent illness. A significant interaction term, "number of parents/in-laws living in the household-by-familial employment" is shown in Model 11. Among employed men having parents/in-laws living in the household, familial employed individuals are about 32.4% less likely than non-familial employed individuals to report recent illness (odds ratio = 1.851 * 0.365 = 0.676). Also, for familial employed men, having an additional parent/in-law living in the household is associated with a 64.6% smaller chance of reporting recent illness (odds ratio = 0.969 * 0.365 = 0.354). More investigation is needed to explain this association.

Table 5.12 and Table 5.13 show that the degree of role strain is significantly associated with recent illness for both employed women and men. The result of a *t*-test (*t* = -1.895) means that, at the 0.05 level, the effect of role strain on recent illness are not different for women than for men. In addition, tests of interaction effects suggest that the combination of familial employment and family roles such as being married or living with parents/in-laws is associated with a lower risk of recent illness for employed women and men.

b. Gender Differences in Life Affected by Illness in the Past Two Weeks among Young Adults

Table 5.14 presents odds ratios of life affected by illness within two weeks among Taiwanese employed individuals aged 18 to 44. In Model 10, the odds ratios of recent illness for self-employment and familial employment compared to non-familial

Table 5.14. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Adults aged 18 to 44, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	1.100	1.232	1.276	1.272	1.274	1.286	1.357	1.178	1.171	1.160	1.023
Familial employment	.779	.773	.799	.797	.799	.793	.815	.783	.773	.809	1.870
Male		.822	.816	.817	.815	.834	.802	.780	.831	.826	.798
Age		.980†	.973†	.972†	.972†	.964*	.962*	.965*	.970†	.973[m]	.975
Educational attainment											
High school			.647†	.646*	.645*	.646†	.735	.746	.659†	.597*	.595*
Junior college or above			.833	.832	.827	.836	1.116	1.136	.925	.924	.930
Family role factors											
Married				1.039	1.051	1.001	1.138	1.153	1.097	1.094	1.187
Number of unmarried children living together					.987	.995	.979	.987	.993	1.007	1.002
Number of parents/in laws living together						.859	.887	.900	.896	.915	.928
Monthly family income											
The 2nd quarter income level							.631†	.607*	.631†	.605*	.587*
The 3rd quarter income level							.502**	.492**	.479**	.465**	.452**
The 4th quarter income level							.551*	.510**	.518*	.497**	.467**
Working hours per week								1.015**	1.012*	1.012*	1.012*
Role strain index									2.016***	1.988***	1.993***
Frequency of exercise per week											
Missing										1.955***	1.882**
1 to 3 times per week										1.038	.999
4 to 7 times per week										1.272	1.278
Interactions											
Married x self-employed											1.120
Married x familial employed											.227*
-2LL	911.725	907.469	903.345	903.307	903.287	901.151	891.342	878.954	838.405	828.320	824.194

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

employment are not statistically significant. However, these estimates display a highly consistent pattern. While the odds of recent illness for self-employment relative to non-familial employment is consistently greater than 1.0, the odds for familial employment relative to non-familial employment is consistently less than 1.0. This pattern may imply that, compared to non-familial employment, familial employment is associated with more health benefits, and self-employment is associated with less health benefits. Model 10 shows that, for young employed adults, an increase of one year in age is associated with a slightly lower risk of recent illness (at the marginal level of significance). One possible explanation is that, as young adults age, they become more concerned about their health and engage in fewer risky behaviors. The odds of recent illness for the two higher levels of education relative to the lowest level are both less than 1.0 in Model 10, but only one is statistically significant. That is, young employed individuals with a high school degree are about 40% less likely than those without a high school degree to report recent illness. Higher family income is also significantly associated with a smaller chance of reporting recent illness. Model 10 also shows that longer working hours, a higher degree of role strain, and missing values of frequency of exercise are associated with a greater chance of reporting recent illness. The significant term, "married-by-familial employed" (Model 11) indicates that, among young married adults, those working for family firms are 57.6% less likely than those working for a non-familial business to report recent illness (odds ratio = 1.870 * 0.227 = 0.424). Also, for familial employed young adults, being married is associated with a 73.1% smaller chance of reporting recent illness (odds ratio = 1.187 * 0.227 = 0.269). Thus familial employment seems to produce more health benefits than the other two types of employment for young adults, especially for those who are married.

Table 5.15 presents odds ratios of life affected by illness in the past two weeks for employed women aged 18 to 44. In the full model of main effects (Model 10), the odds of recent illness for the two types of employment relative to non-familial employment are not significant. At the marginal level of significance ($0.10 < p < 0.12$), an increase of one year in age is found to be associated with a smaller chance of reporting recent illness. The odds of recent illness for the two higher levels of education relative to the reference category are both substantially smaller than 1.0 and significant. This indicates that higher educational attainment produces strong protective effects against recent illness for young employed women. Family roles factors are not found to have significant effects on recent illness among young women. Model 10 also shows that a higher degree of role strain and missing values of frequency of exercise are associated with a smaller chance of reporting recent illness. Another significant interaction, "married-by-familial employed," is uncovered (Model 11). We find that young married women who are working for family firms are 45.8% less likely than those working for non-familial business to report recent illness (odds ratio = 8.464 * 0.064 = 0.542). In addition, for familial employed young women, being married is associated with a 92% smaller chance of reporting poor health (odds ratio = 1.247 * 0.064 = 0.080). Thus, for married young women, familial employment appears to yield more health benefits than non-familial employment. Familial employment seems to provide some benefits, such as schedule flexibility or a work environment that provides social support, for womens' roles as wives and mothers.

Table 5.16 presents odds ratios of life affected by illness within two weeks among Taiwanese employed men aged 18 to 44. In the full model of main effects (Model 10), the odds ratios of recent illness regarding the two types of employment compared to non-familial employment are not significant. Note that the odds for familial employment relative to non-familial employment on health are consistently less than 1.0. On the other

Table 5.15. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Women aged 18 to 44, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	1.323	1.471	1.298	1.311	1.276	1.232	1.453	1.277	1.159	.984	1.535
Familial employment	.987	1.036	.953	.969	.994	.959	.955	.999	1.023	1.198	8.464*
Age		.973[m]	.957*	.960†	.962†	.953*	.956*	.956†	.962†	.963[m]	.968
Educational attainment											
High school			.424**	.423**	.424***	.422**	.500*	.509*	.415*	.365**	.374*
Junior college or above			.462*	.463*	.435*	.443*	.610	.621	.444†	.417*	.443†
Family role factors											
Married				.915	1.017	.934	1.047	1.042	.979	1.073	1.247
Number of unmarried children living together					.890	.891	.872	.870	.832	.852	.877
Number of parents/in laws living together						.805	.824	.815	.819	.840	.852
Monthly family income											
The 2nd quarter income level							.744	.752	.874	.830	.819
The 3rd quarter income level							.617	.652	.707	.684	.649
The 4th quarter income level							.561	.565	.646	.638	.599
Working hours per week								1.011	1.007	1.009	1.011
Role strain index									1.894***	1.837***	1.864***
Frequency of exercise per week											
Missing										2.529**	2.368**
1 to 3 times per week										1.265	1.133
4 to 7 times per week										.906	.967
Interactions											
Married x self-employed											.520
Married x familial employed											.064*
-2LL	437.780	435.260	427.603	427.504	426.718	424.705	422.181	418.912	403.863	394.672	388.832

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table 5.16. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Men aged 18 to 44, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Types of Employment										
Self-employed	1.008	1.077	1.189	1.180	1.155	1.173	1.126	.960	.958	1.001
Familial employment	.574	.554	.580	.583	.569	.573	.601	.532	.494	.485
Age		.985	.985	.980	.977	.972	.962[m]	.966	.967	.969
Educational attainment										
High school			.941	.928	.946	.948	1.043	1.027	.953	.907
Junior college or above			1.394	1.385	1.439	1.440	1.903†	1.861†	1.685	1.786
Family role factors										
Married				1.127	1.041	1.018	1.156	1.170	1.142	1.097
Number of unmarried children living together					1.088	1.096	1.115	1.130	1.233	1.223
Number of parents/in laws living together						.913	.965	1.010	.998	1.001
Monthly family income										
The 2nd quarter income level							.524†	.483*	.435*	.439*
The 3rd quarter income level							.394*	.357**	.293**	.300**
The 4th quarter income level							.561†	.483*	.439*	.444*
Working hours per week								1.018*	1.015*	1.015†
Role strain index									2.366***	2.338***
Frequency of exercise per week										
Missing										1.280
1 to 3 times per week										.748
4 to 7 times per week										1.080
-2LL	471.610	470.895	468.461	468.277	467.860	467.460	459.566	450.095	419.226	416.644

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

hand, the odds for self-employment relative to non-familial employment are consistently greater than 1.0 until weekly working hours are controlled in Model 8. It may be that, for young self-employed men, a greater chance of reporting recent illness is due to longer working hours (also see Table 5.5). Higher family income is found to have protective effects against recent illness for young men. Model 10 also shows that longer working hours and a higher degree of role strain are significantly associated with a higher risk of recent illness. No interaction term is found significant.

Table 5.15 and Table 5.16 show that the risk factors for recent illness are quite different for young employed women than for young employed men. For young employed women, an increase in age and higher educational attainment are associated with a lower risk of recent illness. For young employed men, higher family income provides protective effects against recent illness. In addition, while longer working hours are related to a greater likelihood of reporting recent illness for young men, it exhibits no significant health effects for young women. A higher degree of role strain is associated with a greater chance of reporting recent illness for both young women and young men. The result of a *t*-test (t = -1.313) suggests that, at the level of 0.05, the effects of role strain on recent illness are not significantly different for young women and for young men. Lastly, the interaction effect shows that familial employment may yield more health benefits than other types of employment for young married women.

Another noteworthy finding is that higher educational attainment is significantly associated with better health for young employed women, but not for young employed men. The resource substitution theory (Mirowsky and Ross 2003) is a plausible explanation for this difference. This theory suggests that, when facing the absence of one standard resource, more highly educated individuals are more apt to use some other resource and find ways to achieve ends with whatever they find available. Because of

traditional gender role expectations, young employed women are more likely than young employed men to experience work-family conflict. For example, since standard resources such as public day care programs are not widely available in Taiwan (Yi 1994), young employed women are more likely to apply the skills, abilities, and resources obtained through higher education to cope with role conflicts or role overload.

c. Gender Differences in Life Affected by Illness in The Past Two Weeks among the Middle Aged

Table 5.17 presents odds ratios of life affected by illness within two weeks among Taiwanese employed individuals aged 45 to 64. In the full model of main effects (Model 10), the odds of recent illness for the two types of employment relative to non-familial employment are both less than 1.0, but these effects are not significant. Note that, although the odds for familial employment relative to non-familial employment are insignificant, they are greater than 1.0 in Model 1 through Model 7 until weekly working hours is controlled in Model 8. The implication is that middle-aged familial employed individuals work longer hours than non-familial employed ones, and that long-hours spent working in turn increases the chance of recent illness. On the other hand, the odds for self-employment relative to non-familial employment are consistently less than 1.0 (but insignificant) in Model 1 through Model 10. It may be that, compared to working for non-family business, self-employment may yield more health benefits for middle-aged people. Model 10 also shows that a higher degree of role strain is associated with a greater chance of reporting recent illness. Model 11 presents a significant interaction of recent illness among middle-aged people. The significance of "married-by-self-employed" implies that, among married middle-aged individuals, those who are self-employed are about 40 % less likely than those who are non-familial employed to report life affected by recent illness (odds ratio = 4.992 * 0.122 = 0.609). Also, for self-

Table 5.17. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Adults aged 45 to 64, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Types of Employment											
Self-employed	.705	.701	.720	.711	.710	.721	.710	.738	.770	.788	4.992[m]
Familial employment	1.478	1.288	1.266	1.245	1.239	1.195	1.158	.876	.911	.960	4.396
Male		.752	.754	.742	.741	.764	.768	.712	.864	.869	.862
Age		1.033	1.030	1.031	1.031	1.022	1.018	1.031	1.033	1.037	1.036
Educational attainment											
High school			.690	.696	.697	.670	.644	.724	.696	.702	.744
Junior college or above			1.231	1.237	1.236	1.244	1.053	1.195	1.089	1.041	1.001
Family role factors											
Married				1.293	1.290	1.288	1.227	1.218	1.403	1.430	3.474†
Number of unmarried children living together					1.011	1.017	1.041	1.054	1.007	.991	.987
Number of parents/in laws living together						.671	.666	.717	.716	.715	.754
Monthly family income											
The 2nd quarter income level							.734	.832	.885	.844	.812
The 3rd quarter income level							.866	.903	.962	.923	.873
The 4th quarter income level							1.176	1.223	1.369	1.308	1.177
Working hours per week								1.007	1.003	1.005	1.006
Role strain index									1.726**	1.717**	1.689**
Frequency of exercise per week											
Missing										1.246	1.286
1 to 3 times per week										1.381	1.344
4 to 7 times per week										.866	.804
Interactions											
Married x self-employed											.122*
Married x familial employed											.173
-2LL	326.272	324.120	322.357	322.011	322.055	320.170	318.960	308.120	300.368	298.846	294.421

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

employed middle-aged individuals, being married is associated with a 57.6% less chance of reporting recent illness (odds ratio = 3.474 * 0.122 = 0.424). In other words, self-employment may yield more health benefits than the other two types of employment for middle-aged people, especially for those who are married.

Table 5.18 presents odds ratios of recent illness among Taiwanese employed women aged 45 to 64. In the full model of main effects (Model 10), the odds ratios of recent illness for the two types of employment compared to non-familial employment are not significant. With age and education adjusted, middle-aged familial employed women are likely to bear a greater risk of illness than middle-aged non-familial employed women (see Model 3 through Model 7), until weekly working hours are controlled in Model 8. That is, middle-aged familial employed women work longer hours than those who work for non-familial businesses, and the longer hours in turn increase the chance of reporting recent illness. Going back to Table 5.5, we see that young familial employed women work shorter hours than those in other types of employment, but middle-aged familial employed women work longer hours than their counterparts working for other types of business. The shift is likely to associated with the change of roles played by women in family businesses. Younger women may have young children at home, so they may take advantage of working for a family business and enjoy shorter working hours or a flexible schedule. As women enter middle age, they do not have to spend as much time as before on taking care of children. Also, as family businesses are likely to be run by middle-aged men, middle-aged women's role as the "boss's wife" becomes more important in family firms. Consequently, middle-aged women work much longer hours than before. As to middle-aged self-employed women, adjusted for age, their odds of recent illness relative to non-familial employed women are consistently greater than 1.0 (but not significant), even when working hours is controlled (see Model 3 through Model 10). This implies

Table 5.18. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Women aged 45 to 64, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Types of Employment										
Self-employed	1.000	.992	1.132	1.128	1.166	1.159	1.438	1.259	1.218	1.223
Familial employment	.981	.992	1.245	1.231	1.164	1.134	1.240	.576	.566	.499
Age		.989	1.002	1.003	1.010	1.003	1.013	1.035	1.047	1.055
Educational attainment										
High school			1.559	1.562	1.664	1.652	1.377	1.535	1.681	1.606
Junior college or above			1.911	1.913	1.952	2.005	1.396	1.602	1.737	1.608
Family role factors										
Married				1.096	1.059	1.086	.708	.703	.852	.783
Number of unmarried children living together					1.175	1.168	1.197	1.288	1.212	1.232
Number of parents/in laws living together						.649	.605	.640	.622	.633
Monthly family income										
The 2nd quarter income level							2.039	1.944	2.283	1.941
The 3rd quarter income level							2.906	2.410	2.866	2.269
The 4th quarter income level							4.425[m]	4.245	4.647	4.173
Working hours per week								1.020	1.017	1.018
Role strain index									1.564	1.493
Frequency of exercise per week										
Missing										.313
1 to 3 times per week										1.146
4 to 7 times per week										.794
-2LL	136.646	136.584	135.199	135.175	134.702	133.908	131.039	124.466	122.275	119.741

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

that, compared to the other two types of employment, self-employment may yield fewer health benefits for middle-aged women. Model 10 also shows that role strain is not significantly associated with recent illness. No significant interaction effect is found among middle-aged women.

Table 5.19 presents odds ratios of life affected by illness within two weeks among Taiwanese employed middle aged men. In the full model of main effects (Model 10), the odds ratios of recent illness for the two types of employment compared to non-familial employment are not significant. Note that, with age and educational attainment adjusted, the odds for self-employment relative to non-familial are significantly less than 1.0 (see Model 3 to Model 7) until working hours is controlled in Model 8. These estimates suggest that, middle-aged self-employed men are at least 52% less likely than middle-aged non-familial employed men to report recent illness. This is probably related to the fact that self-employed individuals have more autonomy and control over the duration and timing of work (Reynolds and Renzulli 2005).

As to familial employment, the odds of recent illness for familial employment relative to non-familial employment are consistently greater than 2.0 (but not significant) in Model 1 through Model 10. This finding may be associated with their roles in family firms. Middle-aged men have to be responsible for the success of the family business to all the workers (they are usually members of the extended family), and the increased pressure could be detrimental to their health. In Model 10, the odds of recent illness for the two higher levels of education relative to the reference category are both less than 1.0, but only one of them is statistically significant. Among middle-aged employed men, those with a high school degree are 68.7% less likely than those without a high school degree to report recent illness. Model 10 also shows that a higher degree of role strain and

Table 5.19. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Men aged 45 to 64, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Types of Employment										
Self-employed	.611	.515[m]	.478†	.465†	.468†	.473†	.429†	.477[m]	.520	.521
Familial employment	4.021	3.663	2.901	3.084	3.109	2.790	2.226	2.577	3.043	3.634
Age		1.070†	1.055	1.057	1.056	1.047	1.043	1.048	1.046	1.056
Educational attainment										
High school			.327†	.332†	.333†	.310†	.338†	.382	.302†	.313†
Junior college or above			.847	.856	.859	.841	.861	.959	.704	.713
Family role factors										
Married				1.724	1.735	1.688	1.962	1.881	2.033	2.082
Number of unmarried children living together					.983	.993	1.026	1.030	1.012	.999
Number of parents/in laws living together						.676	.677	.725	.818	.811
Monthly family income										
The 2nd quarter income level							.482	.565	.650	.634
The 3rd quarter income level							.603	.685	.720	.689
The 4th quarter income level							.713	.764	.947	.910
Working hours per week								1.004	1.000	1.002
Role strain index									2.169**	2.114*
Frequency of exercise per week										
Missing										3.215†
1 to 3 times per week										1.418
4 to 7 times per week										.946
-2LL	186.736	183.048	178.792	178.133	178.125	177.101	175.397	170.804	163.781	159.755

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

missing values on weekly exercise are associated with a greater chance of reporting recent illness. No significant interaction effect is found among middle-aged men.

Comparing Table 5.18 and Table 5.19, we find that the association between certain type of employment and recent illness tends to vary by gender. For instance, self-employment appears to yield health benefits for middle-aged men, but not for middle-aged women. Existing research indicates that the different amount of social capital among different types of self-employed workers (e.g., professionals, skilled, or unskilled) is associated with individuals' psychological distress (Barbieri 2003). Thus, it is possible that middle-aged men and women in Taiwan tend to be in different types of self-employed businesses and so possess different amounts of social capital. More research is needed to verify this assumption.

In addition, familial employment seems to produce more detrimental health effects for middle-aged men than for middle-aged women. Because middle-aged men are more likely the primary decision makers in family firms (Lu 1996), they may face a higher degree of pressure than do women, and greater pressure may in turn compromise their health.

d. Gender Differences in Life Affected by Illness in the Past Two Weeks among the Elderly

Table 5.20 presents odds ratios of life affected by illness within two weeks for employed individuals aged 65 or over. In the full model of main effects (Model 9), no significant differences in recent illness are found for the elderly in different types of employment. No consistent pattern of odds ratios on recent illness regarding different types of employment is exhibited across the nine models. Surprisingly, Model 9 shows that the odds of recent illness for the two higher levels of educational relative to the lowest level are extremely large (both of these two odds ratios are more than 100). This is

Table 5.20. Odds Ratio for Life Affected by Illness within Two Weeks among Taiwanese Employed Adults aged 65 or over, 2002

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Types of Employment									
Self-employed	1.467	1.501	3.064	3.166	1.668	3.068	3.359	3.782	4.148
Familial employment	1.050	1.057	2.407	2.398	1.412	6.393	3.767	3.341	2.924
Male		1.229	.910	.894	.526	.434	.532	.538	.493
Age		.973	.950	.949	.971	1.000	.982	.959	.945
Educational attainment									
Elementary school			5.590	5.718	9.253[m]	20.476†	45.910†	44.157†	134.585†
Junior high school or above			13.081†	14.211†	21.766†	137.602*	187.529†	160.672†	1376.078[m]
Family role factors									
Married				.864	.778	1.449	.759	.951	.410
Number of unmarried children living together					1.982[m]	2.314	3.747†	3.346†	4.640
Monthly family income									
The 2nd quarter income level						5.830	5.502	6.565	8.782
The 3rd quarter income level						.264	.242	.327	.135
The 4th quarter income level						.543	1.381	1.657	1.320
Working hours per week							1.007	1.008	1.009
Role strain index								.591	.633
Frequency of exercise per week									
Missing									.830
1 to 3 times per week									.050
4 to 7 times per week									.511
-2LL	43.113	42.949	38.623	38.612	35.723	31.739	28.461	28.100	26.795

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

almost surely the consequence of small cell size (the sample size of the reference group and the two higher educational levels are 15, 19, and 8, respectively). No other significant risk factor is found in Model 9. On the other hand, Model 7 and Model 8 show that having additional unmarried children living in the household is associated with more than a 250% greater chance for the elderly to report recent illness. It is possible that these unmarried children are still dependents of the employed elders, but this finding may also be a result of small sample size. No significant interaction effect is found.

C. Summary

Probably due to the small sample size of self-employment and familial employment, no significant health differences among the three types of employment are found in the supplementary data set. However, results still suggest that, depending upon gender and the stage of the life course, the associations between types of employment and health status vary in interesting ways. For instance, familial employment appears to be more beneficial than non-familial employment for young adults' health, but this advantageous impact is not significant among the middle-aged or elderly populations. Among young married women, the familial employed are found significantly less likely than the non-familial employed to report recent illness. Familial employment might provide schedule flexibility and a supportive working environment for young married women, which are unlikely to be available in non-familial employment, so they can cope with work-family conflicts more easily and enjoy better health.

As to middle-aged people, the familial employed seem to be more likely than the non-familial employed to report recent illness. For middle-aged women, the adverse health effect of familial employment might result from long working hours. Probably due to a lesser burden of childcare and more responsibilities as a "boss's wife", middle-aged familial employed women tend to work longer hours at their job than their counterparts in

other types of employment (see Table 5.5). As longer working hours is likely associated with a higher risk of ailments, middle-aged familial employed women have a greater chance of reporting recent illness.

Self-employment is more beneficial for health for middle-aged people than for young adults. This may be because middle-aged entrepreneurs are more experienced and financially secure than their younger counterparts. Thus, young self-employed individuals may experience a higher degree of psychological stress. The analyses of interaction effects show that, among middle-aged employed individuals, the combination of self-employment and marriage produces protective effects against recent illness. This is probably because married self-employed individuals receive both domestic and business assistance from family members. When we examine the interaction of gender and self-employment, we find that self-employment tends to yield health benefits for middle-aged men but not for middle-aged women. It is likely that middle-aged men and women tend to be in different types of jobs (e.g., professionals, skilled, or unskilled) of self-employed businesses that entail different advantages or challenges in the work environment.

While role strain in general is found to be significantly associated with a greater chance of reporting recent illness, tests of interaction effects in each gender-by-age group show that multiple roles yield health benefits in certain social and demographic contexts. The combination of familial employment and marriage is associated with a lower risk of recent illness for young adults, especially for young women. Alternatively, the combination of self-employment and marriage is more beneficial to middle-aged people. These findings support my research hypothesis that, depending on the social and demographic context, the effects of multiple roles on health will vary. In the above two cases, the combinations of certain family roles (such as daughter in-law or the head of the

family) and certain types of employment may create a more supportive working environment.

Another important finding is that higher educational attainment produces health benefits for young employed women, but not for young employed men. The resource substitution theory (Mirowsky and Ross 2003) provides a plausible explanation for this result. That is, due to role expectations and the lack of support in regard to domestic work, young employed women are more likely than young employed men to apply whatever resources they can find to cope with role conflicts or role overload.

CHAPTER 6: SUMMARY AND CONCLUSION

I began this dissertation by citing the fact that gender differences in health in Taiwan are consistently reported in national surveys or official statistics. Taiwanese women appear to be more likely than Taiwanese men to evaluate their own health status as poor. Nevertheless, the risk factors and the mechanisms through which they operate to produce gender differences in health in Taiwan remain poorly understood. Most existing health studies in Taiwan focus on differentials in male and female health behaviors for the Taiwanese population (e.g., Chiu et al. 2002; Chen et al. 2001; Tseng 2004). Results reveal that women are more likely than men to engage in health protective behaviors. However, the female advantage in healthier life style cannot explain why women tend to report poorer health than do men.

Link and Phelan (1995) argue that social factors such as socioeconomic status and social support are fundamental factors related to health or morbidity. There is evidence that gendered differences in health are a consequence of the stratification system (Denton, Prus, and Walters 2004; Ross and Bird 1994). Because men and women differ in regard to social-structural locations, their exposure to a hazardous environment, their participation in risky health behaviors, and their access to goods and resources that promote well-being are quite different (Bird and Rieker 1999). Therefore, I turn to gender stratification in Taiwan society to find the underlying causes of gender differentials in health.

In current Taiwan society, women remain disadvantaged in terms of educational attainment, labor force participation, and division of domestic labor. Inasmuch as the gender difference in educational attainment are decreasing in Taiwan, this dissertation gives special attention to the health effects of employment and family roles on individual

health among Taiwanese men and women. The role accumulation hypothesis and the role strain hypothesis are often applied to explain the combined effects of employment and family roles on health. Nevertheless, existing studies provide limited discussion of how health effects of multiple roles, i.e., the combination of family and work roles, vary in different contexts such as gender, age, the type of employment, and the nature of family roles. Accordingly, this dissertation attempts to extend prior research to test these two hypotheses in different role contexts in Taiwanese society. Because many married women in Taiwan are informally employed in family firms (Lu 1992; Yi and Chien 2002), this research also pays attention to examining the impact of working in a family business.

Specifically, this dissertation pursues the following five aims: (1) to investigate whether, and to what extent, gender differentials in health exist in Taiwan, (2) to examine whether, and to what extent, social factors like education, employment, and family roles contribute to gender differentials in health in Taiwan; (3) to examine whether gender differences in health in Taiwan increase or decrease by age, and examine whether the risk factors of health vary by age; (4) to examine the effects of multiple roles on health in different role contexts and to test the role accumulation and role-strain hypotheses; (5) to investigate possible psychosocial factors mediating the effects of employment on individual health status for Taiwanese men and women. Here, I address the findings most relevant to these objectives by drawing on the results presented in Chapter 4 and Chapter 5.

GENDER DIFFERENCES IN HEALTH IN TAIWAN

Results in Chapter 4 demonstrate the extent to which gender differences in health outcomes in Taiwan varies depending on the health measures examined. While men are on average about 45% less likely than women to report recent illness or poor health, no

significant gender differences in the prevalence of chronic diseases is found. A possible reason for insignificant gender differences in chronic diseases is the measurement employed in this study. The dichotomous measure used here can only differentiate "has" from "does not have" chronic diseases, but cannot assess the number and types of chronic ailments, which could be very different for men than for women (Verbrugge 1985). On the other hand, although the magnitude of the gender gap in recent illness and in poor self-rated health remains stable across the three age groups, gender differentials in chronic diseases varies by age. That is, young men are found to be about 20% less likely than young women to report chronic ailments, but the gender differences are insignificant among the middle-aged and elderly populations.

In addition, the results of logistic regression analyses reveal that gender differences in health in Taiwan, at least for recent illness and self-rated health, can be partly accounted for by social and behavioral factors. The most prominent determinant of gender differences in health in Taiwan is employment. This finding provides evidence suggesting that gender stratification in the labor market in Taiwan substantially contribute to the different health outcomes reported by Taiwanese men and women. Results also show that different sets of social or behavioral factors account for gender differences in health in different age groups. For young adults, risky health behaviors, such as alcohol consumption and smoking, are the most significant determinants of gender differentials in health. For middle-aged people, educational attainment, employment, family income, and risky health behaviors together explain a substantial degree of gender differences in health. For the elderly, education, marital status, and employment contribute to the gender gap in health.

THE ASSOCIATIONS BETWEEN SOCIAL FACTORS AND HEALTH OUTCOMES

Educational attainment is found to contribute to gender differences in health among middle-aged and elderly Taiwanese. This implies that the consequences of gender stratification in education for health start to have an effect during and after middle age. This pattern can be explained by the accumulating effects of education (Mirowsky and Ross 2003; Ross and Wu 1996). This theory argues that the health-related effects of education accumulate and compound over a lifetime, and then produce larger health differences between persons with different levels of education. It is also the case that the gap in education between young men and young women is relatively small.

Consistent with existing studies (e.g., Chang and Chiang 2002; Ofstedal, Zimmer and Lin 1999; Pan and Lee 1999), results show that higher educational attainment in general produces protective effects on health for Taiwanese adults. For both women and men, having a junior college or above degree is associated with a lower risk of recent illness and poor self-rated health. One noteworthy finding is that, while higher educational attainment is associated with a lower risk of recent illness among young employed women, it exhibits no significant effects on young employed men's health. I find the resource substitution theory (Mirowsky and Ross 2003) provides a plausible explanation for this gender differential pattern. This theory argues that, when facing the absence of one standard resource, higher educated individuals are more apt to find alternative resources to achieve their goals with whatever they find available. Traditionally, women are defined as the main caretakers of young children. Given the lack of public daycare service in Taiwan, young employed women need to apply whatever resources are available to cope with family-work conflicts. Thus, the differences of learned effectiveness between the higher educated and the lower educated become evident among young employed women.

Sometimes the beneficial impacts of educational attainment on health are not significant in the full model of main effects, but we find that educational effects on health are mediated through employment or higher family income. In certain age-by-sex groups, higher educational attainment is positively associated with adverse health outcomes. For instance, among elderly men, higher education is associated with a higher risk of chronic diseases. One possible explanation for this unexpected association is that higher educated men are more likely to survive in the aging process which results in a greater chance of reporting chronic ailments. However, some inconsistent effects of high school education on health remain difficult to explain. For instance, a high school degree is found to be associated with a greater chance of reporting poor self-rated health for young women and a higher risk of chronic diseases for middle-aged men. Thus, future research is needed to explore further associations.

Results suggest that employment is the most significant socioeconomic factor related to adults' health status. Employment in general is associated with a better health status for Taiwanese adults, especially for the middle-aged and elderly individuals, but this may be due to reverse causation. Compared to women, men's health is more associated with type of employment. There is no consistent pattern found in regard to which type of employment is associated with a lowest risk of adverse health for all adults. Rather, depending on the gender and age of workers, certain types of employment yield more health benefits than others. For instance, familial employment is linked to a lower chance of reporting recent illness for young women, but it is associated with a higher risk of recent illness for middle-aged and elderly women. Since women's roles in family firms are likely the extension of their family roles (Lu 1996), the impacts of familial employment among women in different age groups are probably associated with the roles they play in family firms as well as in the family. For young familial employed women,

their roles in family firms are likely to be the mother of young children (or grandchildren) of the employer. Thus, in order to take care of children, young familial employed women might enjoy schedule flexibility or shorter work hours. In turn, they are likely to experience less work-family conflicts compared to young women working in other types of businesses. Middle-aged women, probably due to a smaller burden in childcare and more responsibilities as a "boss's wife", tend to work much longer hours than their counterparts in other types of employment. The long working hours may then account for the detrimental health effects of familial employment among middle-aged women. For men, self-employment and non-familial employment are more likely associated with a lower risk of adverse health outcomes. It is likely that familial employed men, especially for the middle-aged and elderly, face greater pressure from their combined roles as family heads and as employers..

Because of using cross-sectional data sets, this research is not able to control health selection effects. However, while part of the health differences between the employed and the non-employed may be explained by health selection of the labor, some studies show that employment does yield protective effects on health (Graetz 1993; Hewitt Baxter and Western 2006; Ross and Mirowsky 1995). Findings of this research also imply that employment is beneficial to individual health. Also, the positive association between employment and health is found to be partly mediated through higher family income. In addition, health selection cannot fully explain the health differences among individuals in different types of employment. To illustrate, health selection cannot explain why the familial employed are likely to be healthier than their counterparts in other types of employment. It is not plausible that healthier young women are particularly likely to choose familial employment over the other two types of employment. Thus, this dissertation proposes that, in addition to health selection effects,

the economic benefits and the characteristics of working environments together help to account for the health differentials among individuals who are in different types of employment and those who are not currently employed.

Results in Chapter 4 and Chapter 5 show that, compared to educational attainment and employment, family roles have less significant impacts on health. In general, family roles such as martial status and living arrangements with children or parents/in-laws are more significantly associated with health status for women than for men. As women are traditionally defined as primary homemakers and caregivers, it is expected that their health outcomes are more likely associated with their parental or filial roles. Logistic regression analyses reveal that the impacts of certain family roles on health vary with age and gender. For instance, having unmarried children living in households is in general beneficial for women's health, but not for men's. In addition, living with parents/in-laws is associated with a lower risk of reporting chronic diseases and poor self-rated health, particularly for young women. This is likely because parents/in-laws provide help in childcare or housework for young women. In contrast, because middle-aged women are more apt to be responsible for taking care of elderly parents/in-laws, living with parents/in-laws is associated with a higher risk of chronic ailments for middle-aged women. Moreover, being married is associated with a smaller chance of reporting poor self-rated health for middle-aged women and a lower risk of recent illness for elderly women. No significant effects of family roles on health are found among the young and middle-aged men. Being married and living with married children appear to be associated with a lower risk on adverse health outcomes for elderly men. This could be due to the fact that elderly men are likely to spend more time at home and receive social support or social control from their family members.

THE EFFECTS OF MULTIPLE ROLES ON HEALTH

As indicated in Chapter 2, two theoretical hypotheses are often applied to explain the health impacts of combinations of work and family roles. The role accumulation hypothesis proposes that the benefits of role accumulation on health tend to outweigh any stress caused by multiple roles (Dennerstein's 1995; Sieber 1974; Waldron and Jacobs 1989). In contrast, the role strain hypothesis suggests that multiple roles cause role overload and role conflict that contribute to increased stress and excessive demands on time, energy, and psychological resources that then results in poorer health (Verbrugge 1986; Waldron and Jacobs 1989; Waldron and Weiss 1998). In this dissertation, I test the interactions of types of employment and family roles to assess the effects of multiple roles on health. Each interaction term yields two sets of health comparisons: (1) the comparison between the multiple roles bearers and the non-employed individuals with the same family role; (2) the comparison between multiple role bearers and the individuals in the same type of employment but with less family responsibilities. Results of both types of comparisons, in general, tend to support the role strain hypothesis. However, the impacts of multiple roles on health do vary depending on social and demographic context.

Compared to the non-employed with the same family role, multiple roles bearers on average are less likely to report adverse health outcomes. However, because of the following three reasons, I do not regard these results as evidence in support of the role accumulation hypothesis. First, since this research used cross-sectional data sets, I am unable to control for baseline health for individuals. Thus, the better health outcomes among those who are currently employed could be partly the consequences of health selection of the labor market. Second, a number of significant interactions in results show that individuals with certain combinations of employment and family roles report poorer

health than those non-employed with the same family role. For instance, young non-familial employed women with unmarried children are more likely than non-employed young women with the same number of unmarried children to report chronic ailments. Also, self-employed middle-aged women with parents/in-laws living in the household are more likely than their non-employed counterparts to report chronic diseases and recent illness. These findings are inconsistent with the role accumulation hypothesis. Third, if multiple roles tend to produce more health benefits, we should find that multiple role bearers have better health than employed individuals with less family responsibilities. However, as I will discuss in the next paragraph, that is not the case.

Compared to individuals in the same type of employment, but with less family responsibilities, those with multiple role are more likely to report adverse health outcomes. To illustrate, non-familial employed and familial employed women with young children living in the household are more likely than their counterparts with fewer children living at home to report chronic diseases. Also, among non-familial employed young men, those with unmarried children living at home are more likely than those with fewer children to report poorer health. On the other hand, certain additional family responsibilities yield health benefits for employed individuals. For instance, middle-aged non-familial employed and familial employed women who have more children living in the household is associated with a smaller chance of reporting recent illness. The implication is that, for middle-aged women, unmarried children living at home are at least teenagers and demand less time and effort for baby-sitting or other kinds of care. Instead, older children may provide psychological support or assistance in housework for their working parents. Also a noteworthy finding is that, for elderly non-familial employed individuals, living with married children is associated with a higher risk of recent illness. Two explanations are possible. Working could be an extra burden for

elders if they have to provide financial support for their married children or even their grandchildren or that elderly persons who are ill are more apt to move in with their adult children. Alternatively, elderly persons who are ill may move in with their adult children.

Based on the analyses of two types of comparisons regarding multiple roles, I argue that multiple roles are more likely than not to result in adverse health outcomes, especially for employed women. However, the role strain hypothesis is not sufficient to explain all the health effects of multiple roles. The impacts of multiple roles on health also depend on demographic or social factors such as gender, age, the type of employment, and the nature of family roles.

THE MECHANISM OF THE ASSOCIATION BETWEEN EMPLOYMENT AND HEALTH

Analyses for the supplementary data set imply that the impacts of different types of employment on health are likely mediated through working conditions such as working hours or a more supportive work environment. For instance, probably because of their roles as young mothers, young married familial employed women enjoy shorter work hours and probably flexible work schedules. On the other hand, perhaps due to a reduced burden in childcare and increased responsibility as "boss's wife", middle-aged familial employed women usually work for longer hours and in turn experience adverse health outcomes. Another example is that, among middle-aged employed individuals, the combination of self-employment and marriage produces more protective effects against recent illness than other combinations of multiple roles. This is possibly because middle-aged married, self-employed individuals receive both domestic and business assistance from their older children. Among the covariates included in the supplementary data, the role strain index is the most significant risk factor for recent illness. However, there is no evidence to show that the role strain factors examined in this research mediate the effects of employment on recent illness. One possible explanation of this finding is that the index

used in this research might not be a valid measure of role strain. The role strain index employed only assesses the time pressure felt by respondents, but fails to address the potential stress resulting form gender roles and values, which determine what sphere (home or work) an individual most identifies with and how much power in the marriage one has (Hochschild 1989). Thus, more investigations regarding the mechanism between types of employment and health are recommended in the future.

CONCLUSION

In Chapter 2, I propose four research hypotheses. While three of them are at least partly supported by the research findings, one research hypothesis remained unverified. First, I propose that *gender differentials in health among Taiwanese adults are associated with gender stratification on education, employment, and family roles in Taiwan society. Thus, women's overall disadvantageous social status leads them to report poorer health than do men.* Results of logistic regression analyses support this hypothesis. Among the three health measures examined in this research, gender differences in health are displayed in recent illness and poor self-rated health. No significant gender differential in chronic diseases is found. With controls for educational attainment, types of employment, and family roles, the gender differences in recent illness and poor self-rated health are substantially decreased. These findings suggest that social factors contribute to differences in male and female morbidity in Taiwan. Among the three major social factors examined, employment is the most significant determinant of gender differences in health.

Second, I hypothesize that *gender differentials in health and the patterns of association between health and work and family roles vary among people at different stages of the life cycle and for different health measures.* This hypothesis is partly supported by the research findings. Since the age-by-sex interaction term was not found

to have significant effects on any health measure examined, I chose to divide the sample into three age groups (18 – 44, 45 – 64, and 65+) and estimate regression models for each of them to investigate the age effects on health. Among the three health measures, gender differences in health are found to significantly decrease with age only in regard to chronic diseases, while the magnitude of gender gap in the other two health measures remain stable across the three age groups. However, as predicted by the hypothesis, for each health measure, the effects of employment and family roles on health appear to vary in different age groups. The impact of employment is more significant among the middle-aged and elderly populations, and the impact of marriage is more evident among the elderly people.

Third, I hypothesize that *women are more likely than men to experience negative health effects of a combination of work and family roles, but the health impacts vary among those working in family firms and in other types of businesses*. This hypothesis is supported by most of the findings. Results show that the combination of employment and having unmarried children living in households is more likely associated with adverse health outcomes for women than for men. This implies that women are more likely than men to face work-family conflicts. On the other hand, among employed young women, the familial employed are less likely than those in other types of employment to experience the detrimental health impacts accompanied with multiple roles. The protective effect of familial employment is particularly significant among young married women.

Last, I propose that *the health effects of types of employment are mediated through psychosocial factors related to role strain*. This hypothesis is not supported by analyses of the supplementary data set. Although role strain in general appears to be associated with a higher risk of recent illness, no significant evidence suggests that it

mediates the effects of employment on health. Rather, the analyses reveal that working hours mediate the impacts of employment on health.

CONTRIBUTIONS AND LIMITATIONS

While existing studies of gender differences in health in Taiwan focus on the comparisons of male and female health behaviors, this research highlights the important influence of education, employment, and family roles in shaping the gender gap in morbidity. Results of this research indicate that gender differentials in health in different age groups are determined by different sets of social and behavioral factors. In addition, this study demonstrates that the impacts of multiple roles on health vary depending on social and demographic variables such as gender, age, the type of employment, and the nature of family roles. Specifically, the findings reveal an interesting pattern of association between familial employment and health for women. In addition, analysis of the supplementary data set suggests that the effects of employment on health are partly mediated through working hours. Moreover, this study recommends certain avenues for future investigations of gender differences in health in Taiwan.

There are three major limitations of this research. First, due to the limited sample size in both the main and the supplementary data sets, small cells emerged during statistical analyses, especially for small subgroups such as familial employment and living with parents/in-laws. Consequently, estimates of important covariates such as employment and education often fail to reach statistical significance. Second, measurements of certain variables included in this research may create problems. For instance, the dichotomous measure of chronic diseases used in this research can only differentiate the "has" and "does not have" chronic ailments, but does not tap the number and types of chronic ailments, which could be very different for men than for women. In addition, the measure of role strain fails to address the possible psychological distress

resulting from gender ideology. Lastly, since this research uses a cross-sectional data set, the possible problem of health selection in the labor market and in marriage cannot be controlled.

Appendix A

Table A.1. Comparisons of Odds Ratio of Chronic Diseases for Weighted and Unweighted Data, Taiwanese Adults, 2000-2002

	Weighted	Unweighted
Male	.979	1.021
Age	1.051***	1.054****
Educational attainment		
High school	.968	1.038
Junior college or above	1.089	1.085
Marital Status		
Married	1.033	1.013
Employment status		
Self employed	.784†	.764*
Non-familial employment	.845	.858
Familial employment	.703†	.707†
Monthly family income		
Missing category	1.058	1.023
The 2nd quarter income level	1.022	.997
The 3rd quarter income level	1.043	1.085
The 4th quarter income level	.905	.915
Living arrangement		
Number of parents living in the household	.896	.929
Number of unmarried children living in the household	.973	.991
Health Behavior		
Non- or mild- drinkers	.813	.823
Non- or mild- smokers	1.145	1.175
-2LL	3606.697	3699.887

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table A.2. Comparisons of Odds Ratio of Life Affected by Illness within Two Weeks for Weighted and Unweighted Data, Taiwanese Adults, 2000-2002

	Weighted	Unweighted
Male	.605***	.628***
Age	1.013***	1.013***
Educational attainment		
High school	.850	.842
Junior college or above	.792†	.762*
Marital Status		
Married	.809*	.797*
Employment status		
Self employed	.671**	.668**
Non-familial employment	.776*	.751**
Familial employment	.837	.852
Monthly family income		
Missing category	.770	.773
The 2nd quarter income level	.805*	.822†
The 3rd quarter income level	.887	.876
The 4th quarter income level	.774*	.760*
Living arrangement		
Number of parents living in the household	.944	.970
Number of unmarried children living in the household	.927†	.920*
Health Behavior		
Non- or mild- drinkers	.884	.908
Non- or mild- smokers	.986	1.031
-2LL	3946.622	3947.708

† p<.10; * p<.05; ** p<.01; *** p<.001
[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table A.3. Comparisons of Odds Ratio of Self-Rated Health for Weighted and Unweighted Data, Taiwanese Adults, 2000-2002

	Weighted	Unweighted
Male	.538***	.552***
Age	1.014***	1.014**
Educational attainment		
High school	.790†	.740*
Junior college or above	.721*	.694**
Marital Status		
Married	.841[m]	.840[m]
Employment status		
Self employed	.820	.825
Non-familial employment	.968	.944
Familial employment	.815	.822
Monthly family income		
Missing category	.832	.799
The 2nd quarter income level	.587***	.586***
The 3rd quarter income level	.689**	.652**
The 4th quarter income level	.536***	.523***
Living arrangement		
Number of parents living in the household	.880†	.925
Number of unmarried children living in the household	.932†	.940
Health Behavior		
Non- or mild- drinkers	.981	1.040
Non- or mild- smokers	.809	.852
-2LL	3530.932	3528.891

† p<.10; * p<.05; ** p<.01; *** p<.001
[m]. The p-value of this coefficient is between 0.10 and 0.12.

Table A.4. Comparisons of Odds Ratio for Life Affected by Illness within Two Weeks for Weighted and Unweighted Data, Taiwanese Employed Adults, 2002

	Weighted	Unweighted
Types of Employment		
Self-employed	.971	.960
Familial employment	.861	.790
Male	.893	.885
Age	.989	.990
Educational attainment		
High school	.692†	.724
Junior college or above	.965	.998
Family role factors		
Married	.969	.991
Number of unmarried children living together	1.026	1.017
Number of parents/in laws living together	.903	.900
Monthly family income		
The 2nd quarter income level	1.294	1.099
The 3rd quarter income level	.755	.740
The 4th quarter income level	.850	.834
Working hours per week	1.008†	1.008†
Role strain index	1.851***	1.798***
Frequency of exercise per week		
Missing	1.773**	1.667*
1 to 3 times per week	1.120	1.091
4 to 7 times per week	1.164	1.109
-2 LL	1191.311	1167.674

† p<.10; * p<.05; ** p<.01; *** p<.001

[m]. The p-value of this coefficient is between 0.10 and 0.12.

Appendix B

The following calculation procedures are quoted from Ross and Bird (1994: 166).

The equation modeling the age-related effect of sex on health is:

$$Y = b_0 + b_1 (male) + b_2(age) + b_3(age \times male) \quad (1)$$

Solving for males:

$$Y_M = (b_0 + b_1) + (b_2 + b_3)\, age \quad (2)$$

Solving for females:

$$Y_F = b_0 + b_2 (age) \quad (3)$$

To solve for the age at which women's ealth equals men's, we set equations for men and women equal:

$$b_0 + b_2(age) = (b_0 + b_1) + (b_2 + b_3)age,$$

$$-b_1 = b_3(age)$$

$$-b_1/b_3 = age \quad (4)$$

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